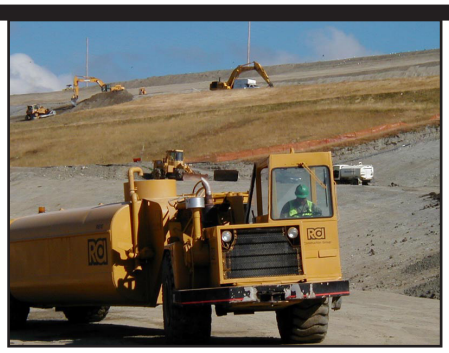
Performance Audit Report

King County

Solid Waste and Wastewater Treatment Utility Operations

Report No. 1002103



September 16, 2009

Washington State Auditor Brian Sonntag, CGFM

www.sao.wa.gov

What we found

Overarching Issues

- The County overcharges the Solid Waste Division, the Wastewater Division, transit and other departments for central services. The County also charges these departments questionable fees for general government services.
- The utilities do not adequately control employees' overtime. In addition, the utilities overbudget the number of employee positions they need. By doing so, they are inflating the general government costs the County charges to the utilities because the fees are based on budgeted rather than actual expenses.
- The Wastewater Treatment Division:
  - Has not ensured its capital investments in biogas generation are cost-effective
  - Has opportunities to maximize revenue from the sale of biosolids as fertilizer and methane generated from the treatment of wastewater.
- The Solid Waste Division:
  - Could use landfill runoff to generate revenue from the sale of methane and increase capacity, extending the life of the landfill.
  - Spends more than necessary on and does not adequately manage fleet operations. Fleet facilities occupy landfill space and should be relocated to extend the life of the landfill.
- Information system control weaknesses call into question the accuracy of data management uses to monitor and make decisions about utility operations.

Potential cost savings

We identified a total of $78.8 million to $82.4 million in potential cost savings and $4.8 million to $6.8 million in revenue opportunities in following areas:

- Solid Waste Division: Cost savings ranging from $67.1 million to $70.7 million and revenue opportunities ranging from $1.1 million to $3.1 million.
- Wastewater Treatment Division: Cost savings up to $6.6 million and revenue opportunities of $3.7 million.
- Solid Waste and Wastewater Treatment Divisions:
  - A combined $1.4 million in cost-savings if the County charges for central services based on actual costs rather than budgeted costs.
- Transit Division:
  - Cost savings totaling $3.7 million if the amount charged for Central Services reflected the actual costs of the services.

Overarching recommendations

- The County should charge utilities and other departments for services that directly benefit them and reflect the true value of the services provided and the actual cost of operations.
- The Solid Waste Division's Fleet Maintenance should focus on preventative maintenance rather than emergency repairs.
- The County could recirculate leachate and relocate the Solid Waste Division's Fleet Maintenance facility to maximize the life of Cedar Hills Regional Landfill. The County will need to obtain approval from the state Department of Ecology for a permit change to implement this recommendation.
- The County should review construction practices and cost estimation to ensure it does not commit to projects before they are determined to have a cost benefit.
- The County should ensure information technology controls are adequate and consistent with best practices to ensure data integrity is safeguarded and preserved.

Cover photos, left to right: Brightwater Wastewater Treatment Plant, Cedar Hills Regional Landfill, West Point Treatment Plant; courtesy of King County

Why we did this audit

We chose this audit due to its potential to identify cost savings, revenue-generating opportunities and efficiencies that could reduce the utility rates or postpone future rate increases to 1.2 million King County residents who pay for sewer and garbage service. Some of those residents are provided services directly by the County and some receive services from the County via a city or sewer district.

King County's two largest utilities are the Wastewater Treatment and Solid Waste Divisions of the County Department of Natural Resources and Parks. Utility rates are determined by the utilities' operations costs and approved by the King County Council.

The Wastewater Treatment Division generates approximately $250 million from operations at a cost of approximately $170 million each year. The Solid Waste Division generates approximately $91 million and spends approximately $100 million per year. These figures are based on 2007 financial data.

Scope and Objectives

We reviewed King County's Solid Waste Division and Wastewater Treatment Division operations from fiscal years 2005 through 2008 to answer the following questions:

- How effective are King County Utilities in limiting administrative expenses such as administrative salaries charged against them and limiting administrative staffing levels to those necessary for the legal, reliable and safe operation of their utilities?
- How effective is King County in operating these utilities in the most efficient and economical manner possible?
- How effective has King County been in limiting overhead allocations and other expenditures charged against utilities to those that are allowed by state law and municipal code and are reasonable and necessary?

We conducted this audit in accordance with Generally Accepted Government Auditing Standards, prescribed by the U.S. Government Accountability Office. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. We also conducted this audit in accordance with the required elements of Initiative 900, detailed in Appendix A.

The audit cost $1.3 million.

Summarized Audit Issues

Central Service and Finance overhead charges

Each County department pays a portion of overhead costs for central services, such as accounting and human resources. The Solid Waste, Wastewater, Transit and other divisions pay more of these costs than they should.

The County's Office of Management and Budget calculates overhead costs and the County's Finance and Business Operations allocates the costs to County departments. The calculations are based on each department's budgeted amounts and are never adjusted to reflect actual expenses. The utilities' rates, in turn, are based on their operational costs.

If the County's adjusted its overhead charges to reflect actual expenses for central services, the utilities' overhead charges would be reduced by $1.4 million over the next five years. We also identified $3.7 million in savings over five years through the reduction in the amount charged to King County Transit.

In addition, County departments are charged costs associated with the King County Council, the Council Administrator and the County Executive's Office. The County does not support these charges with documentation to show the charges are reasonable. Over the past five years, these costs totaled $9.6 million for both utilities and $27.3 million for transit.

Fleet maintenance management and operations

The Solid Waste Division's fleet operations cost more than necessary and the Division can improve its management of fleet costs.

The Division's fleet maintenance operations employees charge significant amounts of unmonitored overtime. The Division does not measure staff performance against established goals. Additionally, the Division makes excessive emergency repairs in comparison to preventative maintenance; does not have a formal process for inspecting major repairs; does not track damage reports; and does not monitor accumulated repair costs for equipment. Staff members charge more time to tasks not associated with maintaining vehicles than is allowed according to its Standard Operating Procedures.

Fleet maintenance developed a Standard Operating Procedures manual in 1999 that sets performance goals to help management monitor operations and staff productivity. The manual is not used. For example, it requires 90 percent of all major repairs to undergo a quality review process, and classifies this as a high priority. Management does not have a way to determine whether this occurs.

Fleet maintenance spends 82 percent of its time on emergency repairs and 18 percent of its time on preventative maintenance. Best practice is to spend 80 percent of time on preventative maintenance and 20 percent of time on emergency repairs. We estimate maintenance costs can be reduced by $8.8 million to $12.4 million over the next five years by emphasizing preventative maintenance over emergency maintenance.

Fleet facilities and Cedar Hills Regional Landfill

Fleet facilities take up landfill space and should be relocated to extend the life of the landfill.

The County projects its Cedar Hills Regional Landfill will be full between 2016 and 2018. Based on work the Solid Waste Division initiated before this audit, we estimate the landfill could

remain open for two more years if the maintenance shop at the landfill were removed and the space used for garbage. This would result in the County saving approximately $25 million during the two years by not paying to haul garbage to another site.

Additionally, the landfill discharges wastewater into the sewer at a cost of approximately $1 million per year. The landfill could capture the wastewater and recirculate it over the top of the landfill to help existing garbage decay faster and compact tighter, creating additional airspace that will extend the life of the landfill. We estimate by creating this extra space, the landfill could save an additional $31.1 million starting between 2016 and 2018 by not transporting garbage to another location.

The landfill could capture and sell additional methane generated from the recirculation of wastewater into the landfill. We estimate the landfill could generate from $1.1 million to $3.1 million in revenue in methane sales over five years.

The Solid Waste Division will need to pursue regulatory approval from the state Department of Ecology to modify its permit before it can institute these recommendations. The potential cost savings do not include potential costs for implementing the recommendations.

Biogas use

The Wastewater Treatment Division has not ensured its capital investments in biogas generation are cost-effective.

In 2004, the Wastewater Treatment Division developed a plan in response to a King County Executive Order to construct a waste-to-energy system at its West Point Plant to collect methane gas generated from water treatment and use it to generate electrical power.

In 2004, the Division purchased two generators for $4.8 million before it obtained an accurate estimate of how much it would cost to complete the project. The cost to complete the project, which was estimated at $6.1 million in 2004, grew to $39.2 million in 2009. The project is currently on hold.

In addition to using the biogas byproduct to generate electricity, the Division could clean impurities from the gas and sell a portion of the gas to local utilities through the existing pipeline, as it does at the South Plant. Although the County stated the pipeline could not handle the additional gas pressure, it did not consider a partial distribution to the utility. We estimate if the plant sold portion of its biogas as a commodity, it could generate $2.7 million over the next five years.

Overtime Expenses

The utilities do not adequately control or monitor employees' overtime and the utilities overbudget the number of employee positions they actually fill. As a result, the utilities are paying excessive general government costs charged by the County.

The Wastewater Treatment Division budgets for more employees than it hires. The number of budgeted full- and part-time employees – 598.7 – has not changed since at least 2005. The actual number of employees during the audit period ranged from 566 to 553.

The utility's budgeted costs drive the utility rates and result in rate increases that are not based on the actual cost of operations. The perpetually vacant positions also increase the amount of overhead charges the County allocates to the utility.

The utility could save $5.8 million over the next five years by adjusting its budget to reflect the

Division's actual number of employees.

The utility can reduce overtime through oversight and monitoring. We did not examine the reasons why overtime was incurred in all cases, therefore we cannot quantify the amount of overtime that could be avoided by effective monitoring versus overtime that could be eliminated by hiring employees.

Information technology

We found weaknesses in the County's information system that call into question the accuracy of data that management uses to make decisions about utility operations.

The weaknesses in the County's information system may also have affected the data we collected for the audit and upon which we based our findings and recommendations.

Commendations

We identified many leading practices at the County and the utilities.

King County

- Its performance reporting model is a leading practice in providing the public with information on the performance of all County divisions.

Solid Waste Division

- Collects and sells landfill gas as a commodity.
- Applies leading practices to maximize the life of it landfill.
- Incorporates long-range planning into the construction of its landfills.

Wastewater Treatment Division

- Reuses heat generated by its pumps.
- Collects and sells biogas as a commodity at the South Plant.
- Uses reclaimed water for operations at both treatment plants.
- Publishes real-time operational information to the public regarding overflow site conditions.
- Achieved 100 percent compliance with National Pollution Discharge Elimination System's reporting requirements for the past three years.
- Its biosolids program provides oversight for Washington sites that use biosolids to ensure they meet state requirements.

Fleet Administration Division

- Uses tracking software and performance measures to monitor operations and fleet replacement.
- Nearly all mechanics are certified by the National Institute for Automotive Service Excellence (ASE) and have a number of national awards recognizing the quality of service.

For more information

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Performance audit report for King County Utilities

September 15, 2009

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Mr. Brian Sonntag
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September 15, 2009

Dear Mr. Sonntag:

We have completed Phase III of the performance audit of King County Utilities. Our engagement was performed in accordance with our Contract No. 0408-C-K31, dated August 6, 2008. Our procedures were limited to those described in that letter.

Background

In 2005, the voters of Washington state passed Initiative 900 (I-900) authorizing the Washington State Auditor's Office (SAO) to begin conducting performance audits of various Washington state and local government entities. The purpose of these performance audits is to promote accountability and cost-effective uses of public resources through identification of opportunities for potential cost savings.

Scope of our work

The SAO engaged Ernst & Young to complete the King County Utilities performance audit in accordance with Generally Accepted Government Auditing Standards. The audit shall address the following objectives from the request for proposal (RFP):

- *Administration* – At the time of this audit, how effective are the King County Utilities in limiting administrative expenses such as administrative salaries charged against their utilities, and limiting administrative staffing levels to those necessary for the legal, reliable and safe operation of their utilities?
- *Operations* – At the time of this audit, how effective is King County in operating these utilities in the most efficient and economical manner possible? This audit objective includes, but is not limited to, operational costs associated with: solid waste collection, processing and disposal; and collection, treatment and conveyance of wastewater and sewage.
- *Overhead allocation* – Over the past three years, how effective has King County been in limiting overhead allocations and other expenditures charged against utilities to those that are allowed by state law and municipal code and are reasonable and necessary? This includes, but is not limited to, central service allocations and charges from other county departments.

The performance audit shall also address the following I-900 objectives:

- Identifying cost savings.
- Identifying services that can be reduced or eliminated.
- Identifying programs or services that can be transferred to the private sector.
- Analyzing gaps or overlaps in programs or services and recommendations to correct them.
- Assessing the feasibility of pooling the entity's information technology systems.
- Analyzing the roles and functions of the entity and recommendations to change or eliminate roles or functions.
- Recommending statutory or regulatory changes that may be necessary for the entity to properly carry out its functions.
- Analyzing the entity's performance data, performance measures and self-assessment systems.
- Identifying leading practices.

The above objectives are focused on the county's operations and exclude the county's wastewater and solid waste construction management practices. The performance audit is delivered in four phases: diagnose current state, define and design audit plan, execute audit plan and summarize communication and report results.

Results of our work

From October 2008 to February 2009, Ernst & Young executed the audit plan designed for the selected list of risk areas in Phase II of the performance audit. Based on information gathered using data analytics, flow charts, interviews, testing and benchmarking, we identified issues and leveraged our subject matter resources to recommend leading practices and or to create suggested standard procedures, processes, controls and recommendations to King County.

A draft performance audit report was delivered to the State Auditor's Office on April 13, 2009. An updated report was shared with King County on August 14, 2009, which contained our recommendations for the County and was the basis for the County's responses.

Restrictions on the use of our report

Ernst & Young assumes no responsibility to any user of the report other than the Washington State Auditor's Office. Any other persons who choose to rely on our report do so entirely at their own risk.

We appreciate the cooperation and assistance provided to us during the course of our work. If you have any questions, please call Michael Kucha at +1 206 654 7741.

Very truly yours,

Ernst & Young LLP

Contents

Introduction

Background

In November 2005, the voters of Washington State passed Initiative 900 authorizing the state auditor's office to begin conducting performance audits of various Washington state and local government entities. The purpose of these performance audits is to promote accountability and cost-effective uses of public resources by identifying opportunities for potential cost savings. These savings can be achieved in a number of ways, such as reducing or eliminating services, implementing leading practices, changing or eliminating roles and functions and pooling of information technology. In addition to these opportunities, Initiative 900 seeks recommendations for statutory or regulatory changes that may be necessary for an entity to carry out its functions properly.

We have conducted a performance audit of King County Solid Waste and Wastewater Treatment Division operations for the period of January 1, 2005 to December 31, 2007 to examine the efficiency and effectiveness of biosolids management, biogas use, leachate management, central service and finance overhead charges, overtime approval and fleet management operations.

We conducted this performance audit in accordance with generally accepted *Government Auditing Standards*. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our issues and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our issues and conclusions based on our audit objectives.

Objectives

- Administration - At the time of this audit, how effective is King County in limiting administrative expenses such as administrative salaries charged against their utilities, and limiting administrative staffing levels to those necessary for the legal, reliable, and safe operation of their utilities?
- Operations - Over the past 3 years, how effective has King County been in limiting overhead allocations and other expenditures charged against utilities to those that are allowed by state law and municipal code, and are reasonable and necessary? This includes, but is not limited to, central service allocations and charges from other County departments.
- Overhead - At the time of this audit, how effective is King County in operating these utilities in the most efficient and economical manner possible? This audit objective includes but is not limited to operational costs associated with solid waste collection, processing and disposal; and collection, treatment and conveyance of wastewater and sewage.

The performance audit was also planned and performed to address the nine elements in Initiative 900[1]:

- Identifying cost savings
- Identifying services that can be reduced or eliminated
- Identifying programs or services that can be transferred to the private sector
- Analyzing gaps or overlaps in programs or services and recommending to corrections to gaps or overlaps
- Examining the feasibility of pooling information technology systems within King County Utilities
- Analyzing the roles and functions of King County Utilities and making recommendations to change or eliminate roles or functions
- Recommending statutory or regulatory changes that may be necessary for King County Utilities to properly carry out its functions
- Analyzing of King County Utilities' performance data, performance measures and self-assessment systems
- Identifying of leading practices

[1] A matrix identifying these elements with respect to the audit areas is presented in Appendix A.

Methodology

We conducted this performance audit in accordance with generally accepted government auditing standards (GAGAS). Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We planned and performed the performance audit to:

- Obtain an understanding of the area being audited
- Consider legal and regulatory requirements
- Identify and review management controls applicable to the area
- Identify criteria needed to evaluate matter subject to the audit
- Identify and examine sufficient, appropriate sources of evidence to provide a reasonable basis for our issues and conclusions based on our audit objectives
- Determine the need for technical professional assistance
- The needs of government officials, ratepayers and other users

In planning our audit, Ernst & Young developed a multi-phased statement of work. The project was conducted in four phases:

1. Phase 1 – Conduct a performance and risk assessment to identify improvement opportunities in the form of leading practices and/or issues (Leading practices are identified in Appendix B). Identify areas that have the greatest opportunity to reduce costs and improve efficiency.
2. Phase 2 – Develop a work plan for the highest risk areas identified in Phase 1 to determine issues and recommendations.
3. Phase 3 – Execute the work plan.
4. Phase 4 – Issue the final performance audit report to the state auditor's office and assist the state auditor's office with presentations to state legislators, legislative committees or King County Council members.

Our work included:

- Conducting interviews with managers and staff
- Identifying applicable regulatory requirements and controls
- Validating our understanding of controls by walking through processes and procedures with control owners
- Performing a benchmarking analysis to determine how well the utilities being reviewed perform relative to their peers (A benchmarking analysis is presented in Appendix C)
- Testing transactions and records for effectiveness of controls and adherence to policy
- Reviewing policies and procedures
- Reviewing Solid Waste and Wastewater Treatment reports
- Surveying employees
- Analyzing processes to identify potential cost savings or efficiencies
- Reviewing IT general controls for systems pertinent to our issues and conclusions
- Developing tables identifying elements of a issue for all issue areas

The issues and conclusions within this report include sections that identify potential cost savings. We used multiple procedures to calculate potential cost savings, including review of data generated by IT systems in several of the issues. As part of our audit procedures, we reviewed the IT general controls for these systems. The IT review identified several deficiencies in internal control with respect to these IT systems. The identified IT general control deficiencies create potential uncertainty regarding the accuracy of potential cost savings calculations, which are shown under the discrete heading "Effects of recommendation - potential cost savings and other impacts." The

potential cost savings that are based on computer-generated information may be accurate, or may be either higher or lower as a result of the IT general control deficiencies and are considered to be informational only. The IT control deficiencies are identified as separate issues in our report.

These issues include:

- Information Technology system change controls do not meet industry standards
- Information Technology access controls do not meet industry standards
- Access to data centers and environment controls in the data centers do not meet industry standards

The issues that contain potential cost savings based on IT generated data include:

- Central Service and Finance overhead charge (OH.1, OH.2)
- Approving Overtime (OT.1, OT.2, OT.4)
- Fleet maintenance management (FL.2, FL.3, FL.4, FL.7)

We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Scope

The performance audit focused on two King County Utility operations:

- King County Solid Waste Division (SWD)
- King County Wastewater Treatment Division (WTD)

Ernst & Young tested data and records mainly related to fiscal year 2005-2008, although Ernst & Young also obtained data related to the current fiscal year for certain tests and analyses. All operations included in this performance audit have a fiscal year matching the calendar year. Ernst & Young began the performance audit in August 2008 and completed fieldwork in February 2009.

The performance audit analyzed data from December 31, 2005 through December 31, 2007. Ernst & Young conducted an initial risk assessment of the entire SWD and WTD Divisions to identify the best opportunities for improvement. Potential issues were identified in the planning of the audit and Ernst & Young worked with the Washington State Auditor's Office (SAO) in selecting the issues to include in the audit scope. Further audit steps resulted in additional refinement of the audit scope to include the following issue areas:

- Central Service and Finance Overhead Charges (Note - in order to review the charges made to the utilities, it was necessary to perform a comprehensive review of the allocation process across King County. During this process, we noted that allocations to Transit and other funds were significant and we have included those conclusions in our findings)
- Fleet Maintenance Management
- Leachate Recirculation
- Overtime Expenses
- Biogas Use
- Biosolids Management
- Information Technology

Summary of impact of recommendations

The tables below identify potential cost savings, revenue opportunities, and reductions in general fund costs allocated to the utilities that could be realized over a five year period following implementation of recommended actions. In addition, we identified questionable general government costs allocated to the utilities and to other County funds. Exceptions include measures associated with fleet operations or landfill leachate recirculation that will extend the operational life of the Cedar Hills Landfill. Savings in these areas would be realized after 2018 which represents the date of landfill closure under the present condition. Where applicable, cost allocation values related to the issue areas are also identified.

As noted in the Methodology paragraph above, we identified deficiencies with the IT general controls. The potential cost savings are based on computer-generated information and may be accurate, or may be either higher or lower as a result of these control deficiencies. A summary of potential cost savings, revenue opportunities and reallocation of general fund costs, are presented in the next three tables:

Central services overhead charges[2]:

To determine the amounts of questioned costs allocated to the WTD and SWD, it was necessary to identify all costs allocated. Based on that work, we identified cost savings based on use of actual expenses. We also identified questionable general government costs allocated outside of the County's general fund.

Issue Area	5-Year Potential Cost Savings[3]	Questionable costs allocated over the past 5 years[4]
Solid Waste Division	$650,000	$4,852,335
Wastewater Treatment Division	$750,000	$4,818,183
Transit	$3,700,000	$27,334,015
County-wide Effect	$10,200,000	$60,427,761

[2] Estimate based on analysis of 2005 – 2009 financial information.
[3] The reductions in costs that could be achieved if central service costs allocated were adjusted to reflect actual expenses.
[4] Questionable cost allocations to non general fund departments may in whole or in part correspond with services provided but these charges are unsupported.

Other Audit Areas:

The following summarize the 5-year potential cost savings and potential revenue opportunities identified in the audit findings for the audit areas of

Solid Waste Division:

Issue Area	5-Year Potential Cost Savings	5-Year Potential Revenue Opportunities
Fleet maintenance management	$36,000,000 to $39,600,000[5] [6]	-
Leachate recirculation	$31,100,000[7]	$1,150,000 to $3,150,000
Overtime expenses	Not Quantified[8]	
Totals	**$67,100,000 to $70,700,000**	$1,150,000 to $3,150,000

Wastewater Treatment Division:

Issue Area	5-Year Potential Cost Savings	5-Year Potential Revenue Opportunities
Overtime expenses	$6,650,000	-
Biogas use	-	$2,700,000[9]
Biosolids management	-	$1,000,000
Totals	**$6,650,000**	**$3,700,000**

The figures above do not include any potential costs related to implementation of the recommendations, which will partially offset the cost savings noted in this report. Although this performance audit was not structured to include detailed implementation plans, we feel that King County has the experience and expertise to develop the specific steps necessary to implement the recommendations.

[5] The range of savings includes an estimated$25,000,000 the SWD can avoid by relocating the fleet maintenance facilities from the Cedar Hills landfill, thereby creating airspace and extending the life of the landfill by two years. This amount is in addition to the savings the Division can realize by recirculating leachate, as described in footnote 7 but does not include costs for siting a new maintenance operation.

[6] The range of savings also includes up to $2,200,000 associated with the fleet maintenance meeting their goal of 20% indirect time charged by staff.

[7] The SWD can reduce their expenses by $1,850,000 over the next 5 years by re-circulating leachate that the Division is currently paying to have disposed in the sewer system. The SWD can generate an additional $1,150,000 to $3,150,00 over the next 5 years by capturing and selling the gas byproduct of the landfill. Based on historical activity, the SWD can avoid costs of $29,250,000 by extending the life of the landfill, which would be realized starting in 2019. These figures do not include expenses to install or operate the re-circulation system which will partially offset the savings.

[8] Our audit did not examine the reasons why overtime was incurred in all cases, therefore we cannot quantify an amount of overtime that could be avoided by effective monitoring versus overtime that is necessary and could be eliminated by using additional staff paid at straight-time. Please see OT.4 for details.

[9] The WTD incurred an additional $540,000 of costs based on the type of generator they selected. This affect on utility rates is discussed in Issue BG-2.

King County Utilities background

Within the King County government's organization, both the Solid Waste Division (SWD) and Wastewater Treatment Division (WTD) reside in the Department of Natural Resources and Parks (DNRP). In turn, the DNRP reports to the Office of the King County Executive. Departments and organizations with King County are supported by internal agencies. Internal service providers performing primarily administrative functions are commonly referred to as central services which are external to the SWD and WTD. Further details on these service providers are discussed in the Central Service and Finance overhead section of this report. Internal Central Service Costs are allocated based on King County's cost allocation plan to departments within the county. Operations specific to the SWD and WTD are detailed in the following two sections.

SWD background and history

The King County SWD strives to provide its ratepayers efficient and reliable solid waste transfer and disposal services. SWD aims to protect human health and the environment and provide value to the taxpayer. The SWD is also a conscientious steward of the environment, supporting waste prevention and recycling programs, green building and sustainable development.

The SWD is an enterprise fund within the King County DNRP. It employs approximately 420 full-time employees and provides solid waste transfer and disposal services for 1.2 million residents and 637,000 who are employed and work in King County. The organizational structure of the utility is presented in Appendix D. There are nine unions within SWD's operations, and about 95% of the workforce is represented by these unions. The SWD currently serves 37 of 39 cities in King County, as well as organization of unincorporated areas. The cities of Seattle and Milton arrange for their own waste disposal.

The operations of the SWD are illustrated in Appendix E. Private third-party contractors are used for curbside collection and transport of waste to transfer stations. The SWD transports waste from the transfer stations and drop boxes to the Cedar Hills Regional Landfill and manages the incorporation of waste and maintenance of the landfill. As illustrated in Figure SWD-1, the division's eight transfer stations are located in Algona, Bow Lake, Enumclaw, Factoria, Houghton, Renton, Shoreline and Vashon Island. The rural drop boxes are located in Cedar Falls and Skykomish. In addition, the SWD also provides recycling collection services at many of its facilities and manages recycling programs and education for communities and businesses. Furthermore, the division helps with special waste collection and disposal, and maintains custodial operations at nine closed landfills. At all landfill facilities, the SWD must continue ongoing environmental monitoring of groundwater, surface water, wastewater and landfill gas to protect human health and the environment.

Figure SWD.1. Locations of SWD managed waste transfer stations, drop boxes and the Cedar Hills Landfill.

Cedar Hills Regional Landfill started operations in the early 1960's. At that time, there were few regulations to govern the design and operations of a landfill; however, environmental awareness and new state and federal regulatory controls have since been adopted and implemented. Currently, there are stricter requirements for managing landfills, such as using landfill liners, impermeable caps and environmental monitoring.

The SWD operates the King County-owned Cedar Hills Regional Landfill; it is the only active landfill in King County. The landfill covers 920 acres and is located in Maple Valley — 20 miles southeast of Seattle. The landfill receives nearly one million tons of solid waste per year from King County's eight transfer stations and two drop boxes. However, the landfill is not open to the general public for the disposal of garbage. Some materials not accepted at the transfer stations may be accepted at the landfill, but only with an approved waste clearance.

Current and future operations performed by the SWD are depicted in the process diagram presented in Appendix E. SWD transfer trucks hauling 18-ton trailers deliver the garbage to an active area of the landfill where it is then tamped down by large bulldozers and temporarily covered in an active segment or "cell" within the landfill. Once the cell is filled to its permitted capacity, it is capped with an engineered cap that is layered with high-density polyethylene (HDFE) and soil to inhibit rainfall infiltration and contact with the waste.

One of the harmful by-products created by the decomposition of solid waste is landfill gas, which primarily consists of methane, a recognized greenhouse gas. Historically, the gas was collected in a series of underground pipes that carried it to an above-ground flare station where it was burned. However, the SWD recently completed construction of a landfill gas to energy project. This new system converts the methane into pipeline-quality natural gas. Operation of this system is being performed by a third-party service provider, Ingenco (doing business as Bio Energy LLC). Bio Energy LLC's system distributes processed landfill gas through an existing Williams Northwest natural gas pipeline located adjacent to the landfill. The SWD anticipates receiving annual payments of more than $1 million associated with the sale of processed landfill gas to Williams Northwest.

Cedar Hills Regional Landfill is expected to reach its permitted capacity in 2018. The SWD is currently researching methods to prolong the life of the landfill beyond this date. However, once the landfill has reached capacity, the SWD plans to export its solid waste to out-of-county landfills.

The SWD is an enterprise fund, and operations are primarily financed through tipping fees charged to customers at transfer stations and at the Cedar Hills Regional Landfill. Tipping fees represent a cost per ton charge as measured at the scale houses at the transfer stations and landfill. The current tipping fee is $102.05 per ton after taxes and applicable surcharges.

The total operating revenues and operating expenditures for 2006 and 2007 are as follows:

	2006	2007
Total operating revenue	$90.9 Million	$91.9 Million
Operating expenditures	$93.7 Million	$100.1 Million

Water Treatment Division (WTD) background and history

The WTD is operated by the King County DNRP through the Water Quality enterprise fund. As an enterprise fund, water treatment is funded and operated separately from other operations of the county and the use of its revenues, bond proceeds and grants-in-aid is restricted by purpose. In accordance with RCW 35.58, the Water Quality fund is used to provide sewage treatment and water pollution abatement services to the urbanized areas of the county. The WTD serves about 1.4 million people within a 420-square-mile service area that extends throughout a broad area of King County and into portions of Pierce and Snohomish Counties. The WTD has long-term sewage treatment agreements with 17 cities and 17 sewer districts that operate sewage collection systems within the WTD service area. These city and regional collectors pay monthly sewage disposal charges to the WTD per contract, which are determined based on operating costs and debt service of the WTD. In addition to the sewer charges, the WTD collects a capacity charge on all homeowners and building owners in the county's service area who have connected to the sewer system on or after February 1, 1990, per RCW 35.58.570 and King County Code No. 28.84.050. These are collected on a 15-year, monthly payment schedule with the option to exercise an early payoff.

The WTD's major facilities include the two regional treatment plants, the West Point and South Treatment Plants, as well as two smaller treatment plants on Vashon Island and in Carnation. The Brightwater Treatment Plant located in the northern part of the region is scheduled to be completed in 2010 with operations starting in 2011. A daily average of 200 million gallons of water treatment from homes, industries and streets reach the county's two regional treatment plants through 47 pump stations, 19 regulator stations and more than 335 miles of sewer pipes. Operations beyond water treatment are also performed by the WTD. These actions include biosolids waste processing, reclaimed water projects, odor control, as well as testing alternative treatment technologies.

The basic water treatment process is depicted in the process diagram in Appendix F. Although this diagram is specific to the West Point Plant, its basic operations are similar to those at the South Plant. As shown in this diagram, water that comes into the plants undergoes a series of processes, including:

- Preliminary treatment: where large debris and inorganic garbage are removed.
- Primary treatment: where wastewaters are skimmed and gravity is settled. Solids are removed and sent to digesters for processing in an oxygen-free (anaerobic) environment.
- Secondary treatment: where a biological process is used to consume the suspended and dissolved organic material, leaving the remaining water or secondary effluent at least 85% cleaner than when it entered the plant.
- Disinfection: the remaining pathogens are chemically destroyed before the final effluent is released into Puget Sound.

The WTD employs about 600 full-time employees and about 40 temporary employees. The capital assets for the WTD, as of its 2007 financial statements, were $2,744 million. The operating revenues and expenditures for the last two years are as follows:

	2006	2007
Operating revenues	$241.3 million	$262.9 million
Operating expenditures	$166.9 million	$170.4 million

Central Service and Finance overhead charges

Audit area background

During our audit we looked at cost allocations originating in three different areas: Central Cost allocations, Finance and Business Operations allocations and DNRP administrative allocations. In order to review the charges made to the utilities, it was necessary to perform a comprehensive review of the allocation process across King County. During this process, we noted that allocations to Transit and other funds were significant and we have included those conclusions in our issues.

King County Central cost allocations
King County's Central cost allocation plan allocates internal central service costs originating in general fund (CX) departments to other departments throughout the county. Central service costs are those amounts expended by the central service departments for administrative activities that benefit the whole County. These functions are typically centralized for efficiency purposes. The cost allocation method consists of 12 cost pools allocated to both CX and non-CX departments.

The allocation methodology used for the 12 cost pools are guided by the King County Code and must be submitted to the King County executive and the Council for review and approval on an annual basis. In 2008, the allocation methodology is as follows:

Allocation basis	Cost pools
2006 Adjusted operating expenses 2008 Proposed FTEs	General government, budget services, strategic planning, personnel services, bus pass subsidy, mail services, records management, and emergency services
2006 Complaints	Ombudsman
2006 Asset value	Fixed asset management
2006 ARMS/IBIS transactions	State auditor
2008 Projected square footage	Building occupancy

DNRP Administrative cost allocations
The DNRP oversees four large divisions, plus the Geographic Information Systems group, which is an internal service fund. The four divisions include: Solid Waste, Water Treatment, Water Land Resources and Parks and Recreation. The overhead costs in DNRP (DNRP Admin) consist of assistance and services provided by the director and the personnel from her office including public relations, human resources, public outreach, administrative staff and the deputy director. The director's office employs approximately 30 people to oversee the divisions under the DNRP.

The DNRP Admin budget is proposed during the department's budget-setting process in October, which is brought to the county executive and must be approved by the King County Council. An estimate of each DNRP division's share of DNRP Admin is also developed using the operating budget as a percentage base for allocation. The previous year's budget from the divisions is used to come up with the current allocation percentage base.

DNRP overhead charges are invoiced quarterly to the divisions based on the budgeting process described above, but the total annual expenditures are "trued-up" to reflect actual expenditures. SWD and WTD make adjustments to true-up their portion of DNRP Admin costs to actual results after the end of the year.

Finance and Business Operations charges

The Finance and Business Operations (FBO) division supports all county agencies with treasury services (property tax collection, investment pooling), procurement and contract services, benefits services and accounting and payroll services. FBO is an internal service fund that recovers its expenses through billings to other King County organizations. Those billings are based on cost allocations calculated to represent the services provided to the receiving organizations.

FBO uses an internal rate model to establish its annual overhead allocations for billing. Each direct or indirect service performed by FBO will have a related allocation basis. Due to the timing of the budgeting process to determine the allocations, like central service allocations, FBO uses data from two years prior to determine the current charges. For instance, for the 2008 allocation charges, FBO will have to use 2006 data for the allocation base. This is because the 2008 budget process is performed in the middle of 2007, resulting in not being able to use 2007 data as well.

FBO rebate

As part of its budgeting process, FBO calculates its total budget in two separate ways: through a "bottoms-up" budget based on what the expected annual needs are, and also through a simple calculation based on the prior year's target budget, escalated by a mandated factor. These two methods typically produce different results, but FBO is only allowed to allocate expenses to receiving organizations based on the mandated total. Therefore, if the bottoms-up total is greater than the mandated total FBO must either reduce its bottoms-up budget or use its fund balance (cash remaining in the fund due to previous budget under-runs) to make up the difference to fund annual operations.

We examined FBO allocations for the years 2005, 2006, and 2007. FBO initially completes its annual allocation model using the bottoms up budget. In each of these years FBO's bottoms-up budget was greater than the mandated budget. FBO chose to use its bottoms-up budget in each of these years, using its fund balance to offset the difference between the budgets. Since outside departments receiving FBO allocations may only be charged the mandated total and the initial allocation model uses the bottoms up budget, FBO must perform an analysis to calculate a rebate amount to receiving departments. After the rebate applications, the FBO allocations are based on the total allowable figure rather than on the bottoms-up budgeted total. The rebate is calculated based on a process with several steps:

FBO rebate calculation elements

	Previous year CX base rate
Plus:	Allowable rate increase
	Current year target CX amount
Plus:	Special program revenue allowed
	CX revised target
Less:	Actual current year CX amount per model
	Amount of CX rebate
Divide:	CX percentage share of rebate
	Total rebate

The rebate amount calculations are allocated based on the percentage of the total amount originally charged to each agency using charges from the prior two years. For example, the 2007 rebate allocation base is calculated using 2005 budgetary information.

Issues and recommendations – Central Service overhead charge

Issue OH.1. King County cost allocations for central services are not adjusted to reflect actual expense which has resulted in increased costs to ratepayers from 2005, 2006 and 2007. Allocations for finance and business operations (FBO) expenses also are not adjusted to reflect actual expenses.

Background
King County's central cost allocations process begins with each proposed budget phase as the county gathers elements from each area to develop allocations. When the final budget is approved, the Office of Management and Budget will allocate charges based on the adopted budget numbers.

During what King County calls its 13th and 14th month (January and February of the following year), it does adjust for actual expenses in many areas. During this timeframe agencies are making calculations to account for the actual expenditures of the prior year. For example, DNRP Admin expenses are adjusted for actual expenditures as described above. In contrast, the Office of Management and Budget does not re-perform the central services allocation process to adjust for actual expenditures. During our audit we asked for, and King County calculated and provided, the actual allocation expense data from central services for the years 2005, 2006, and 2007. We used this data to calculate the difference between the budgeted allocations and the actual expenses for these years. This exercise indicates that Central Services is consistently under running its annual budgeted expenses, meaning they overcharged the departments/organizations that received cost allocations.

We also attempted to obtain actual FBO expenses, however the division was unable to provide the data, in a timely fashion, due to the complexity of its allocation model. In lieu of adjusting for actual expenses, FBO computes a rebate amount for its allocations that represents the unfunded portion of its required budget. The rebate total is, in effect, a reduction in the FBO fund balance. FBO fund balances for 2005, 2006 and 2007 were $1,693,000, $1,849,000, and $663,000 respectively. Therefore, while the rebate process helps to control the fund balance it is not a calculation to true up the allocations for actual expenditures. This results in control deficiencies in the completeness and accuracy of the FBO allocation administration process which may cause an inequitable distribution of FBO expenses. In addition, FBO uses data that is two years old when developing several of its allocation bases. Using budgeted information from the current period would provide a more accurate and equitable distribution of expenses.

Condition
The county accumulates and allocates several cost pools at a central level. These cost pools include general government, personnel services, bus pass subsidy, ombudsman, fixed asset and real property management, countywide mail services, county auditor, state auditor, budget services, business recovery and economic development (BRED), building occupancy, records management and emergency services, and the FBO division. Current practices for cost recovery include development of allocations using each annual adopted budget. This results in allocations to receiving organizations, which continues throughout the year with no adjustments. The budgeted amounts are never adjusted for actual experience either during the year or after the year-end close. Finally, several of the allocations use data for their allocation base that is two years old. For example, the 2007 allocations use 2005 information for their allocation bases.

Criteria
Best practices indicate budgeted cost allocations should be "trued-up" for actual experience. In addition, OMB Circular A-87 requires adjustments of billed central services, stating "A comparison of the revenue generated by each billed service (including total revenues whether or not billed or collected) to the actual allowable costs of the service will be made at least annually, and an adjustment will be made for the difference between the revenue and the allowable costs. These adjustments will be made through one of the following adjustment methods: (a) a cash refund to the Federal Government for the Federal share of the adjustment, (b) credits to the amounts charged to the individual programs, (c) adjustments to future billing rates, or (d) adjustments to allocated central service costs."

Cause
King County's current central cost and FBO allocation practice does not require adjustment to billed cost allocations

Recommendations
Ernst & Young recommends that King County develop and implement a policy that requires adjustments to billed cost allocations to account for actual experience for both cost pool and allocation bases, preferably as significant discrepancies between budget and actual

expenses are discovered. At a minimum, it should be done in the beginning of the subsequent fiscal period. We recommend this be applied to both Central Services and Finance and Business Operations where similar conditions were identified.

Effects of recommendation - potential cost savings and other impacts

Central services - Our analysis of the King County central services cost allocations found that the county under-ran its budget for the three years 2005, 2006, and 2007. We used our analysis of these years to compute a potential five year cost savings total of $10,200,000 for all central services. The potential five-year impact to WTD and SWD would be $750,000 and $650,000 respectively, $3,700,000 charged to Transit and the remainder allocated to other funds.

FBO We could not perform a calculation of the estimated savings, if any, that could be achieved by adjusting finance and business operations allocations to reflect actual expenses, as the complexity of the allocation model used would require extensive effort and modification to perform. However, for the years 2005, 2006, and 2007 FBO allocated a total of $79,900,000 to receiving organizations, which averages to a $133,100,00 total over five years. A more current cost basis for expense allocations will improve the overall process and increase accountability by a more accurate distribution of expenses to receiving departments or organizations. Cost savings estimates are partially based on support collected from IT systems. As noted in the Methodology section and in the Information Technology section of this report, the accuracy of the potential cost savings calculations may be affected by identified IT general control deficiencies.

King County response

King County concurs with the recommendation and is implementing a process to adjust billed amounts for actual expenses for both central services and FBO allocations. See Appendix I for the County's full response.

Auditor's rejoinder

We appreciate the County's response and cooperation during the audit. We continue to recommend that King County develop and implement a formal policy describing its process of adjusting for actual expenses.

Issue OH.2 – King County allocates questionable general government expenditures to all funds.

Background

King County central cost allocations: the County accumulates and allocates several cost pools at a general or central level - these are common services provided to all organizations throughout the county. One of those cost pools is general government expenses which includes the King County Council, Council Administrator, County Executive, Office of the Executive, County Auditor, Executive Services Administration, Economic and Financial Analysis, King County Civic Television and Membership and Dues, and is allocated using the adopted budget for the year. King County uses adjusted operating expenses as an allocation basis for general government costs, meaning that all county organizations - including non-general fund organizations - are allocated significant costs because of their expenditures.
We analyzed general government expense allocations to non-general fund departments. We found multiple areas of guidance, including prior audit results, Office of Management and Budget Circular (OMB) A-87, *Cost Principles for State, Local, and Indian Tribal Governments,* and a King County Superior Court relevant legal decision within the State of Washington.

Prior Audit Finding

We also analyzed the State Auditor's Office (SAO) audit report dated September 27, 2005. This report found that "General government costs originate in the County's General Fund, and may under certain circumstances be allocated to other funds. Such costs can only be allocated to other funds if two requirements are met: the legal restrictions do not prohibit the County to spend the revenues on general government costs and the cost allocations reflect the true and fair values of services rendered to other funds." The funds described by the SAO audit report included the funds we have noted above. As such, the prior audit supports the determination that the County Council, Council administrator, county executive, and Office of the Executive costs should not be allocated outside the general fund unless documented support exists to show these allocated costs reflect the true value of services rendered.

OMB Circular A-87

The Circular specifically addresses general government expenses in Attachment B, Item 23, General government expenses. The Circular states that:
"The general costs of government are unallowable (except as provided in section 41). These include:

"(1) Salaries and expenses of the Office of the Governor of a State or the chief executive of a political subdivision or the chief executives of federally-recognized Indian tribal governments;

"(2) Salaries and other expenses of State legislatures, tribal councils, or similar local governmental bodies, such as county supervisors, city councils, school boards, etc., whether incurred for purposes of legislation or executive direction."

Note: Section 41 referred to above addresses travel costs and is not material to this issue.

Relevant Legal Decision

A King County Superior Court decision also indicates that general government expenses should remain in the general fund. In a court case ruling in the *Okeson v City of Seattle*, in short, the court found that costs can only be allocated to the utility fund if there is a benefit to the utility fund. The court ruled that general government expenses may not be paid through the citizens' utility rates stating, "The Mayor and his staff serve a general government function of oversight and coordination with other Seattle departments. While this activity may benefit City Light, it is of a general administrative nature and facilitates the Mayor's performance of his duties. The work of the Mayor's Office is governmental rather than proprietary in nature."

Condition

Non-general fund departments such as WTD, SWD, Transit and others, are being charged questionable costs that represent general government charges, as there is no documented support to show that these allocated charges reflect the true value of actual services rendered. King County central cost allocations include a pool of expenses described as general government. Within this pool of expenses, we found that certain departmental expenses are questionably allocated because of a lack of a supportable basis for allocation outside the general fund. Specifically, the departments in question within the central cost allocation include the County Council, Council Administrators, County Executive and the Office of the Executive. Current practices for cost recovery include development of allocations using a base of total adjusted operating expenses from its adopted budget. This results in allocations to various organizations including non-general fund organizations.

Criteria
Criteria include a King County Superior Court decision, prior audit results, and OMB Circular A-87.

Cause
Prior to 2008, King County did not adjust its central cost allocations to remove any expenses related to the County Executive or the County Council. In 2008, the central cost allocations were adjusted to remove the salaries and benefits of the County executive and County Council members. However, the remaining associated expenses are still included in the allocations.

Recommendations
Ernst & Young recommends that King County develop and implement a policy that requires documentation showing that central services allocations reflect the true value of services rendered to receiving county departments, and that those allocations are allowable under state law. The prior audit findings clearly indicate that unless an actual service has been provided and documented, general government expenses should be funded by the general fund. Also, a Superior Court decision, from King County, indicates that the costs of general government should not be allocated outside the general fund. King County currently removes salaries and benefits for the County Executive and the County Council members. However, these salaries and associated expenses should be evaluated as to the service provided and the basis for allocation, both of which should be appropriately documented.

Effects of recommendation - potential cost savings and other impacts
Our analysis of the general government allocations consisted of removing the following costs: County Council, Council administrator, County Executive and Office of the Executive. We identified the central cost allocations charged for these departments, and compared this amount to the budgeted general government allocations for fiscal years 2005, 2006, 2007, 2008 and 2009. This analysis indicates that King County charged questionable costs to funds outside the general fund totaling $60,427,761, which includes $4,852,335 and $4,818,183 for SWD and WTD, respectively, $27,334,015 charged to Transit and the remainder allocated to other funds. These questionable cost allocations to non general fund departments may in whole or in part correspond with services provided but these charges are unsupported. The questionable cost estimates are partially based on support collected from IT systems. As noted in the Methodology section and in the Information Technology section of this report, the accuracy of the questionable cost calculations may be affected by identified IT general control deficiencies.

King County response
King County does not concur with the recommendation. See Appendix I for the County's complete response.

Auditor's rejoinder
We appreciate the County's response and cooperation during the audit. We continue to question the expenses related to general government. We also note that the County itself, in the Superior Court decision, indicates that the costs of general government should not be allocated outside the general fund. Although the ruling applies only to the parties in the *Okeson v City of Seattle* case, the County's response appears to contradict the King County Superior Court decision in the relevant case.

Fleet maintenance management

Audit area background

The WTD currently has a rolling fleet[10] of approximately 550 assets. Fleet management services are currently outsourced to the King County Fleet Administration Division (FAD). The vehicles FAD manages consist of cars, trucks and other transport and utility vehicles. In addition to these vehicles, 27 biosolids and grit hauling trucks are maintained and operated by Skagit Transportation, Inc.

King County policies and procedures allow any division within the county to outsource their fleet administration function to the FAD. The FAD is used as a centralized organization that oversees all elements of vehicle-related needs (acquisition, replacement, maintenance and disposal, etc.). The division manages the fleets of more than 188 cities, jurisdictions and government agencies. In addition, The FAD manages a $27 million annual budget for fleet services of more than 3,000 rolling assets.

To join the FAD program, a county agency must first identify funding for purchasing vehicles. In WTD's case, Ordinance 12925 creates a replacement fund specified for vehicle purchases. Lease payments are used for maintenance and future capital expenditures. A summary of purchases and lease payments from WTD to FAD is noted below for the last three years.

Activity	2005	2006	2007
Lease payments	$ 1,581,535.30	$1,897,846.83	$2,093,575.46
Purchases	$ 1,836,232.41	$1,086,673.38	$ 701,263.03

Source: WTD

In contrast to the WTD, the SWD currently self-manages its own fleet operations. It is the only division within the county that oversees all of its own fleet activities.

We focused the audit of fleet maintenance management on the SWD, since the WTD outsources its fleet-related needs to FAD. We did not observe or report issues related to either the WTD or the FAD.

Both SWD Fleet Maintenance and FAD use CCG Faster's Fleet Management System (CCG Faster), a software-based maintenance management system to manage and track fleet repair and maintenance activities.

All records of rolling fleet and inventory parts are kept in CCG Faster. Newly acquired vehicles are entered into the system, along with manufacturer-recommended maintenance schedules.

To keep accurate records of fuel consumption and mileage, CCG Faster has also been integrated with fuel tracking. Daily fuel and mileage readings are taken by an automated sensor and bar code system at fuel stations. This information is downloaded into CCG Faster, allowing for the fleet information to remain accurate and current.

SWD Fleet Maintenance background

The SWD Fleet Maintenance program operates separately from the FAD and is located at the Cedar Hills Regional Landfill in Maple Valley, approximately 20 miles southeast of Seattle. The SWD Fleet Maintenance staff consists of 65 personnel. There are 41 tradesmen working in the shops. In addition, there are four leads (two mechanic automotive machinists, and two oiler leads), two shop supervisors, two maintenance planner/schedulers, four utility assistants, one project/program manager (vacant), two information tech procurement specialists and one operations manager. In the parts store, there are five inventory purchasing specialists, two purchasing specialist leads and one finance manager.

[10] Rolling fleet not only includes actual vehicles used for transportation, but also trailers, pressure washers and heavy machine equipment utilized by the division.

At the shop level, there are 16 mechanics, 11 metal fabricators, 11 equipment service and maintenance specialists (oilers, tire technicians, pressure washers), one electrician, one carpenter, five inventory purchasing specialists dedicated to fleet maintenance and two technical information possessors.

The facility includes three shops: metal shop, mechanics shop, oilers/pressure washers/tire shop. Shop personnel perform the majority of all maintenance activities for SWD's rolling fleet and transfer stations. The types of services provided at the facility include, but are not limited to: mechanical repairs, preventative maintenance, automotive repairs, heavy equipment repairs, welding, fabrication, supplies management and facilities maintenance.

The SWD Fleet Maintenance personnel are represented by five unions. Contract designations among personnel are determined by trade. Union contracts provide specific guidelines for wages, hours and other working conditions for union members. Items covered by contracts include, but are not limited to: rights of management, holidays and vacations, sick leave, health insurance, work schedules and shift hours, seniority and pension. Management of employees is directly handled by King County and is subject to terms of the union contracts. Additionally, all matters not explicitly covered by the language of the contract may be administered by the county.

The SWD fleet inventory includes 230 transportation vehicles (long haul tractors and solid waste trailers), 7 transport and utility trucks and 28 pieces of heavy machinery used for landfill purposes.

The SWD Fleet Maintenance program had an operating budget of $10,339,976 and $10,854,505 for the years 2007 and 2008, respectively. Below is a high-level overview of some of the major components of Fleet Administration for the period from 2005 through 2007. It should also be noted that the SWD maintains a capital equipment replacement program (CERP), which shows original cost of the rolling assets as $42,733,479.

Fleet Maintenance program overview			
	2005	2006	2007
Total labor*	$3,744,024	$4,029,768	$4,064,279
Total parts	$1,634,722	$1,913,662	$1,635,232
Adjustments**	$203,268	$166,799	$219,978
Total repair costs	$5,582,014	$6,110,229	$5,919,489

*Note: Labor amounts noted above are calculated burden rates (labor plus benefits) by the Fleet Maintenance system.
**Note: Adjustments refer to shipping costs, credits and miscellaneous price adjustments.

Source: CCG Faster system

Fleet issues discussed in this report are interrelated. For example, FL.1 relates to a loss of management control. Loss of management control leads to inadequate monitoring of employees, overtime, and increased demand maintenance (see FL.2 – FL.7). To accurately capture cost savings without erroneously double counting a particular effect, some issues refer to others for their savings. For example, FL-2 identifies savings achieved by lowering more expensive demand maintenance with respect to preventative maintenance. FL-6 identifies savings by reducing indirect time (i.e. time *not* spent on fleet maintenance work), thereby improving efficiency and reducing labor hours. Savings generated by reducing overtime (resulting from actions such as better management control as discussed in FL.1) are captured in a prior analysis presented in OT-4.

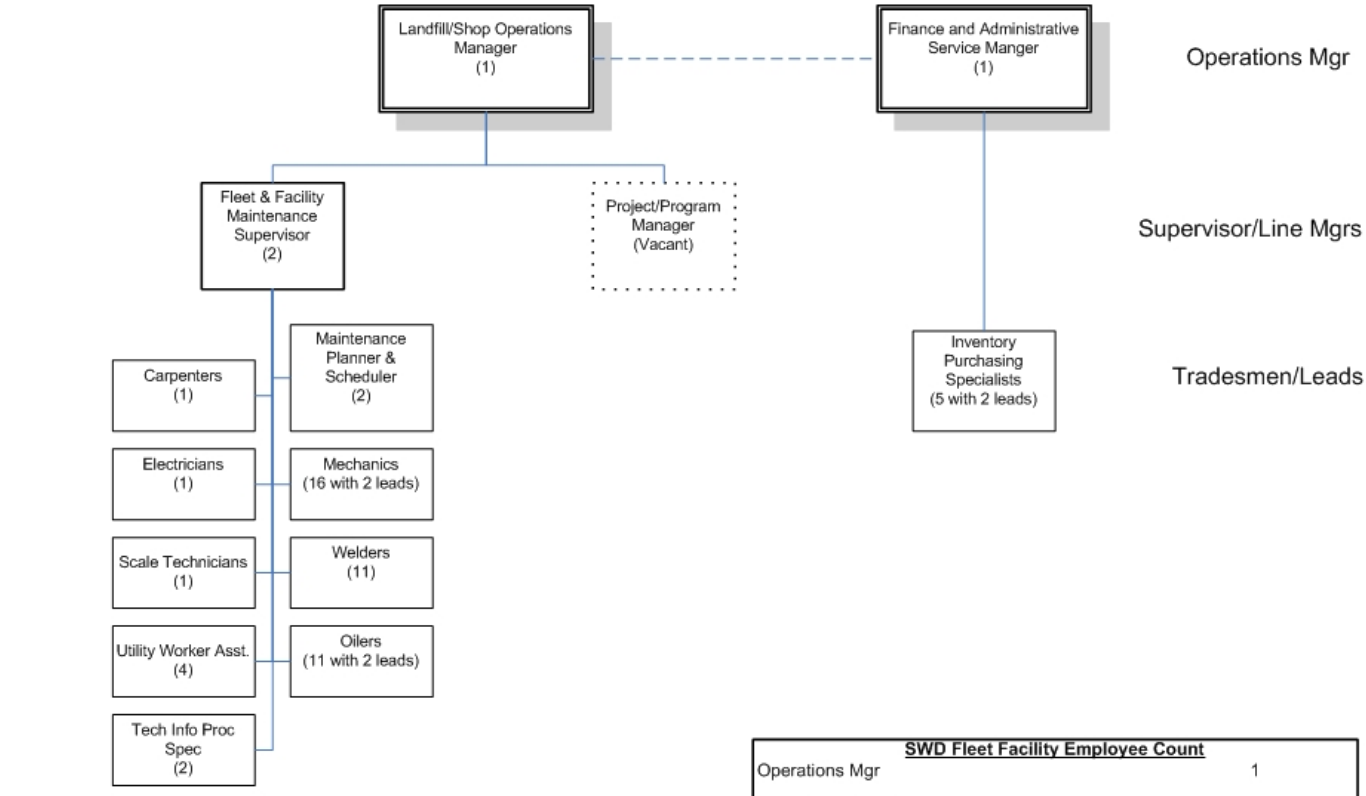
Failure to track key performance indicators (FL.4), relates to quality control inspections and tracking equipment damage reports (FL.3 and FL.5). Application of these recommendations is expected to result in improvement of the demand v. preventative maintenance ratio, overtime and lower labor hours. Hence their savings effects are believed to be captured in the calculations presented in FL.2, FL.6, and OT-4. Cost savings for FL.7 (Life Cycle Cost Model) cost savings exists but are not quantifiable. The cost savings associated with extending the life of the landfill (FL.8) are distinct and separate from other costs savings and discussed with the fleet section.

Issue FL.1 – Monitoring and managerial controls are not adequate to control costs and priorities of the fleet management program.

Background
We requested an organizational chart of the SWD Fleet Maintenance shop and a listing of all the unions represented by the workers. After a review of the organizational shop contact list, we reviewed the management vs. union ratios, which indicated a potential lack of management representation and independence.

We met with shop management to discuss this potential issue. After discussions with management, we recreated the organizational structure of the SWD Fleet Maintenance program to gain a better understanding of the operating and reporting structure, union representation and span of control.

SWD Fleet Maintenance personnel are represented by five unions and nine separate union contracts. Contract designations among personnel are determined by trade. Transfer station operators, scale operators and truck drivers are represented by the largest of these union contracts, Teamster L174. The majority of personnel working at the Cedar Hills Regional Landfill, whether in the Fleet Maintenance facility or operating machinery on the landfill, is union represented employees. Additionally, all individual trades such as welders, electricians and carpenters are represented separately.



Union Representation

Title	Union
Supervisor	IFPTE L17 – Supervisors
Section Managers	IFPTE L17 – Section Mangers
Scheduler/Planner	Local 117 - PT
Mechanics/Oilers	IUOE L302 – Equip Operators
Carpenters	JCC L131 – Carpenters
Electricians	JCC L46 – Electricians
Welders	JCC L104 – Boilermakers
Utility Worker Asst.	JCC - 117
Scale Technicians	Local 77 IEBW
Info Tech Proc Specialists	JCC – 117
Inventory Purchasing Specialists	JCC – L117

SWD Fleet Facility Employee Count

Operations Mgr	1
Fleet & Facility Maintenance	
Supervisors/Line Mgrs	3
Scheduler/Planner	2
Leads	4
Tradesmen	41
Utility Worker Assistants	4
Info Tech Proc Specialists (SPOC)	2
Parts Store/Procurement	
Inventory Purchasing Specialists (IPS)	5
IPS Leads	2
Finance & Admin Svc Manager	1
Total	**65**

Figure FL.1 - SWD Fleet Maintenance Org Chart

Union contracts provide specific guidelines for wages, hours and other working conditions for union members. Items covered by contracts include, but are not limited to: rights of management, holidays and vacations, sick leave, health insurance, work schedules and shift hours, seniority and pension. Management of employees is directly handled by King County and is subject to terms of union contracts.

Condition

The SWD Fleet Maintenance program currently has 65 positions and, at the time of our audit, all positions were filled by organized labor, including the operations manager position, a designated management position. Management responsibilities are performed by union employees and resistance by unions to implement monitoring controls is evident, management has been unable to enhance accountability through efficient monitoring tools. Departmental operation meetings and communication at the staff level are infrequent. Cross-department performance metrics are not in place.

A lack of control and oversight over staff performance, business operations and maintenance activities increases the risk of overtime costs and inefficiencies and reduces accountability. Suggestions on how to reduce demand maintenance (DM) may not be shared with other business units. Opportunities for improvement by highlighting lessons learned may not be realized.

Overall, this reduces management's ability to control quality and increases the risk of indirect charges and lower utilization rates. This also may contribute to lower preventative maintenance (PM) vs. DM targets discussed in audit issue FL.2, avoidance of performance metrics discussed in audit issue FL.4, a reduction in the life expectancy of rolling assets discussed in audit issue FL.7, higher vehicle damages rates discussed in audit issue FL.5 and an obsolete/inefficient quality control program discussed in audit issue FL.3.

Criteria
Contract agreement defines the rights of management as follows: "The Management of the County and the direction of the work force are vested exclusively in the County subject to terms of this Agreement. The County may administer all matters not expressively covered by the language of this Agreement for its duration as the County from time to time may determine." However, span of control can be increased by appropriate controls to business processes and through the use of technology and tools.

In addition, departments and organization units should be integrated and understand how business decisions can impact the overall organization.

Cause
Labor agreements have effectively limited County efforts to more closely monitor employee performance and overtime consumption through the use of technology.

In addition, historical organizational structures have promoted separation of departments.

Recommendations
Management monitoring controls can be enhanced by ensuring management personnel advocate the County's interests by changing business processes and apply monitoring tools and technology. Fleet management should consider using technology to enhance management control and efficiency over business practices. For example, fingerprint based biometric time clocks can be used to track employee time. In addition, management should challenge the use of technology as a management right and document it in union agreements. Management should also improve communication between maintenance and operations at the staff levels. In addition, departments and organization units should be integrated and understand the business impacts a decision can make within the overall organization. We recommend operations and Fleet Maintenance meet to discuss high-level metrics, leading practices, improvement ideas and to identify/rectify issues.

Effects of recommendation - potential cost savings and other impacts
Implementation of monitoring tools can improve overall operations by allowing management to review information in real time to make adjustments to future operations. Benefits to the private sector from strong span of a control environment include: an improved quality control program, streamlined information and improved reporting capabilities and clearly defined policies and procedures. The SWD Fleet Division can experience cost savings noted in audit issue OT.4 for reduced overtime, and FL.2 and FL.6 for greater efficiencies in the use of labor.

King County response

See Appendix I for the County's complete response to this issue.

The County partially concurs with the recommendation. The County indicates, in part,

- Management reviews weekly and biweekly overtime reports to control overtime reports,
- Management, supervisors and leads monitor daily equipment damage reports,
- Implemented facilities equipment inspection program in early 2008

- Weekly or bi-monthly meetings are held to discuss the impacts of procedural changes on operations to ensure changes are implemented throughout the operations system

- The County asserts it fully exercises their management rights with respect to collective bargaining agreements and "when appropriate and necessary engages in bargaining of the decisions and/or effects when appropriate. "The County indicates it is pursuing the negotiation of installation of cameras to improve monitoring with the representing union as directed by the Washington State Public Employees Relations Committee."

The County indicates they "will continue to use and improve upon the meetings, reports and processes described…" Management asserts the controls they have implemented in the last 18 months have been "highly successful, making SWD operations more effective and efficient" with the understanding that "we can still improve and will continue to do so."

Auditor Rejoinder

While we acknowledge the efforts of the County can improve their effectiveness and efficiency, we affirm our finding as these measures will be most effective if actively pursued by management in meeting established goals of the organization and managers and staff are held accountable for meeting those requirements. We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Issue FL.2 – The SWD Fleet Maintenance program spends more than 82% of its time on unplanned maintenance, resulting in higher costs, increased overtime and increased rates charged to ratepayers.

Background

The solid waste division breaks maintenance up into two categories: preventative maintenance (PM) and demand maintenance (DM). Preventative maintenance is scheduled and helps to keep assets in operation and utilized to their fullest capacity and prevents unplanned breakdowns and failures. PM activities include equipment checks, partial or complete overhauls at specified periods, oil changes, lubrication and so on. In addition, workers generally record equipment deterioration/anticipated failures so they know to replace or repair worn parts before they cause a system failure.

DM refers to unplanned maintenance (i.e., something breaks or wears out, parts needing adjustments). DM generally results in excess overtime, higher repair costs, and has the potential to drastically impact operations. When an asset needs to be taken out of service because of an unplanned DM issues, operations may suffer because the asset is no longer in use and maintenance cost may be higher because of the need for overtime or expedited parts delivery.

PM creates less disruption than DM and can be more efficiently managed. For example, PM may take an asset out of service; however, down time can be planned to minimize impact to operations, parts can be ordered ahead of time, and the required mechanics can be scheduled and on-hand. The SWD recognizes that a higher ratio of PM versus DM leads to greater efficiency and less disruption to operations.

See the Fleet Maintenance program overview table above for a summary of maintenance program costs.

We identified that the SWD Fleet Maintenance program performs the majority of the maintenance work on SWD's vehicles. We reviewed damage reports and requested performance metrics. Vehicle damage reports suggested excessive damages, and a lack of performance metrics did not allow us to measure the impact.

We met with SWD Fleet Administration to gain an understanding of SWD’s shop operations and the specific PM and DM tasks performed. Next, we were provided with work order information from the SWD’s CCG Faster system. We analyzed this data to identify and separate PM and DM work orders.

Condition

Fleet management spends most of their repair efforts performing emergency and unexpected repairs, inconsistent with top performing entities. For 2005, 2006 and 2007, SWD's Fleet Maintenance program respectively dedicated 87%, 84% and 82% of its time to DM work and 13%, 16% and 18% of its time, respectively, to PM work. This information is presented graphically in Figure FL-2.

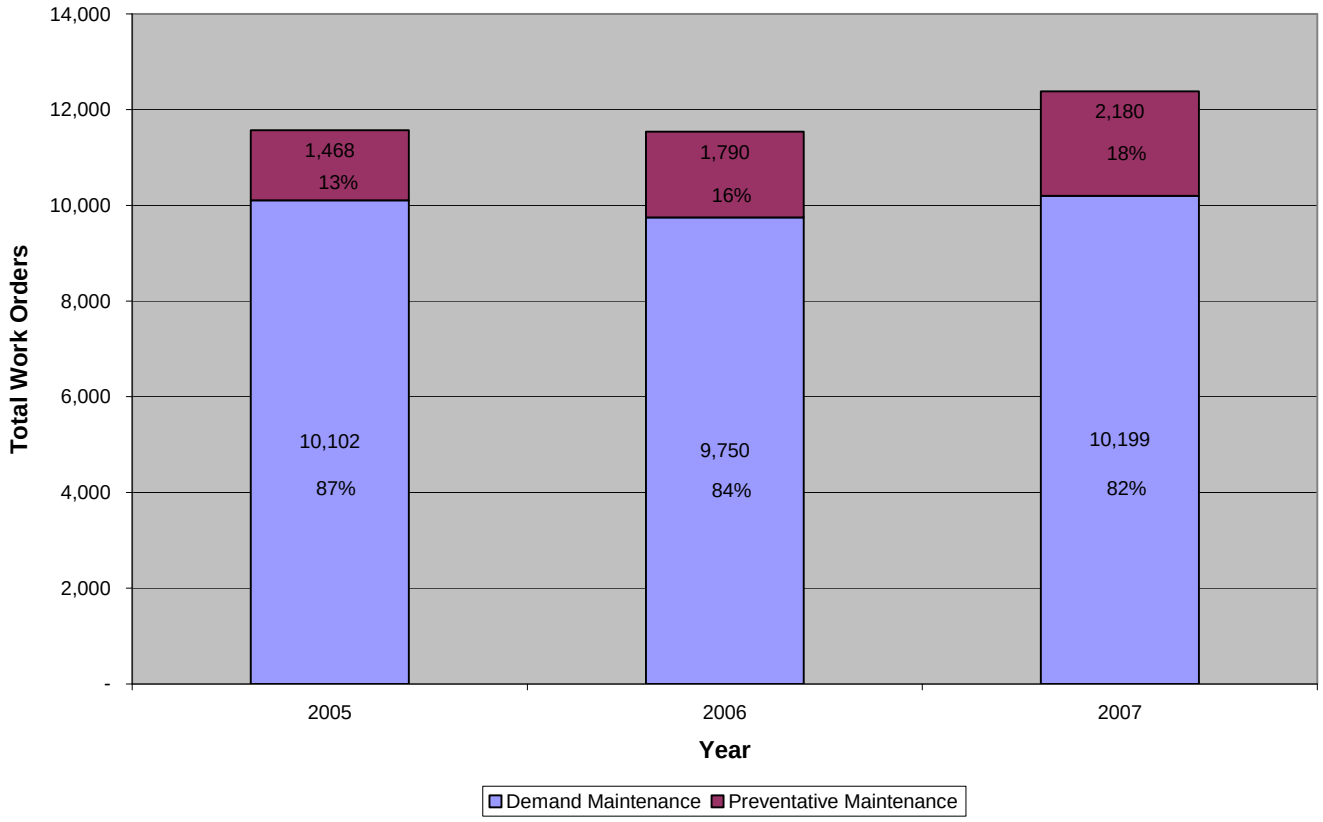


Figure FL-2 – Number of PM and DM work orders by year

As discussed, an ideal preventive maintenance program utilizes more resources for preventative tasks than demand maintenance. We were not able to obtain benchmarks within the solid waste industry. However, for the manufacturing industry an 80%PM/20%DM is best practice. Both the manufacturing and solid waste industries rely on machines and equipment to meet operational goals. When a machine on a factory floor fails and has to be taken out of service the effect is similar to when SWD has to take a tractor or hauler out of service: operations is negatively impacted and maintenance costs go up. The major difference with SWDs equipment is that it's mostly rollstock (vehicles) and a manufacturer's equipment is mostly stationary. Our goal with this benchmark is to show the concept of preventative maintenance and demand maintenance to apply it to the solid waste industry. Similarities exist with the manufacturing benchmarks around the concept that PM work orders should be greater than DM work orders. Generally, this metric can be reviewed to identify problem areas. Factors to consider when measuring the solid waste industry are noted in the cause section.

Heavy wear has put SWD well below industry standards for PM/DM ratios. Shop efficiency is being lost by the constant need for DM. In addition, the heavy wear on the fleet significantly increases the potential for premature retirement of trucks, excess overtime; higher repair costs and has the potential to drastically impact operations. For the three years, 2005, 2006 and 2007, average DM repair costs more than doubled compared to PM repair costs with PM and DM costs averaging $518 and $242, respectively (See Figure FL.3). For every $1 spent on a PM work order, approximately $12 is spent on a DM work order.

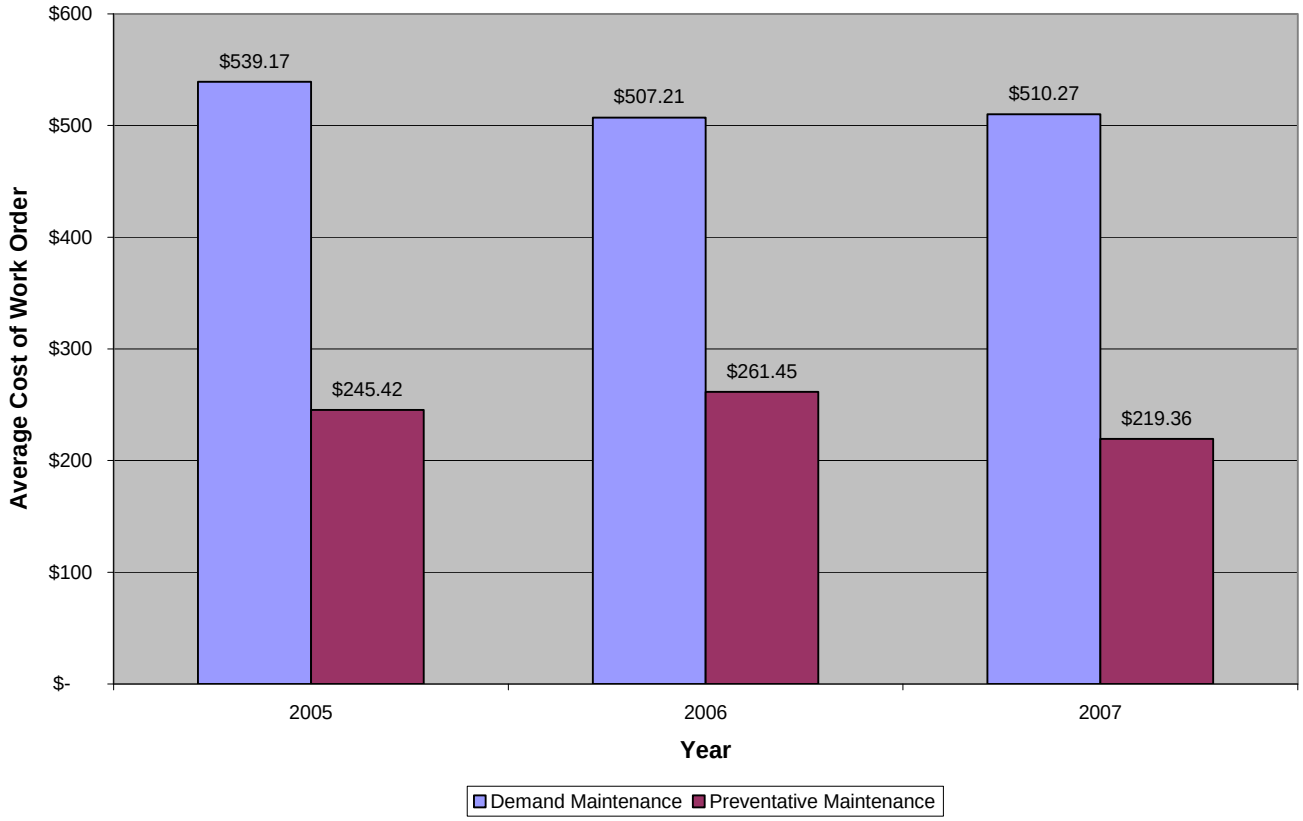


Figure FL-3– Average cost of PM and DM

Criteria

An effective fleet maintenance facility performs all demand and preventative maintenance services for all SWD rolling fleet. An ideal preventive maintenance program utilizes more resources for preventative tasks than demand maintenance. We were not able to obtain benchmarks within the solid waste industry. However, for the manufacturing industry an 80%PM/20%DM is best practice. Our goal with this benchmark is to show the concept of preventative maintenance and demand maintenance to apply it to the solid waste industry. Similarities exist with the manufacturing benchmarks around the concept that PM work orders should be greater than DM work orders. Generally, this metric can be reviewed to identify problem areas. Factors to consider when measuring the solid waste industry are noted in the cause section.

Cause

Management does not advocate the County's interest by failing to emphasize effective and efficient operations, as stated in FL.1. Management has not committed to implementing their Standard Operations Manual or adopting tools that ensure operations and its staff are efficient and effective:

- Effective quality assurance processes (FL.3),
- The commitment to measure performance and monitor performance against established goals on an ongoing basis (FL.4),
- Full use of Equipment Damage Reports to hold equipment users accountable for excessive damage (FL.5)
- Ensured target rates for indirect time charged by staff are met (FL.6)
- Monitoring of repair costs for individual assets to determine if replacement is necessary to reduce emergency repair costs (FL.7)

Fleet management accepts that high demand-related maintenance is part of the business. Management asserts the nature of the solid waste business subjects tractor and trailer equipment to heavy use. Generally, tractors are designed for long-distance, highway travel with minimal tight turns. Instead, SWD's units are used for short routes and are forced to consistently make sharp turns to get in and out of transfer stations — putting additional strain on the tractors. They were not designed for short trips, constant sharp turns, and stop and go traffic. Also, SWD tractors are sustaining damage to tires and the undercarriage from sharp objects at the landfill and damage at transfer stations caused by exceeding the 25 ton maximum capacity and by methods used to fill trailers.

Recommendations

Fleet management should shift priorities from being reactive to being more proactive in its maintenance activities. To accomplish this, fleet management should perform ongoing analysis of DM work orders to identify themes/areas of avoidable repairs. Metrics should be put in place to continuously track the number of occurrences of these types of repairs by employee, root cause and location to increase accountability.

Effects of recommendation - potential cost savings and other impacts

By monitoring the PM vs. DM ratio, management can quickly identify troubled areas, reduce overtime and maintenance costs and increase the life expectancy of rolling assets. For example, prior to the purchase of tippers (equipment that reduces the need for trucks to drive on the landfill and landfill road pavement), 20% of work orders were related to tire damage. Management noted that after the tippers were installed in late 2008 they have seen a significant reduction in overall tire expenses. Implementing recommendations in audit issues FL.1, FL3-7can also improve this ratio. We do not expect SWD's Fleet Maintenance Division to meet the manufacturing industry standards of 80PM/20DM based on the respective requirements for the solid waste industry. However, achieving a target of 60% to 80% PM and 20% to 40% DM could potentially save between $8.8 million and $12.4 million over five years. Cost savings estimates are partially based on support collected from IT systems. As noted in the Methodology section and in the Information Technology section of this report, the accuracy of the potential cost savings calculations may be affected by identified IT general control deficiencies.

King County response

See Appendix I for the County's complete response to this issue.

The County indicates concurrence with our recommendation and is taking steps to improve its demand vs. preventative maintenance ratios by renovating the transfer system and redesigning its compactors to reduce abnormal wear and tear on the equipment. In addition, it has implemented a preventative maintenance program in July of 2008.

Auditor Rejoinder

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Issue FL.3 – The Solid Waste Division's Fleet Maintenance program does not have a formal documented process for quality control (QC) inspections of mechanical repairs nor do they perform the quality assurance (QA) inspections required by Standard Operating Procedures (SOP).

Background
QA in regard to Fleet Maintenance is the practice of assuring high-quality service or repairs by the means of continuous improvements to the repair process. QC is the practice of performing checks to verify the quality of repairs to detect any repair errors or misdiagnosis. According to SWD Fleet Maintenance Standard Operating Procedures, QA/QC inspections should be performed on 90% of the major repairs performed by the maintenance unit. Although this performance standard was established in 1998 and rated as a high priority, the standard has yet to be achieved. Leads and supervisors should review quarterly inventory management reports, and perform daily routine inspections of repairs and completed work on the floor.

We performed a walk-through of the SWD Fleet Maintenance shop. During this walk-through we observed several work orders being performed that lacked a formal QA/QC inspection. Hence, this was noted as a risk area.

We met with shop management to discuss potential risk. In addition, we attempted to review work order data to identify consistent quality control reviewers. However, we were not successful in identifying a routine of quality reviews or an identified QA/QC reviewer.

Condition
SWD Fleet Maintenance does not have a documented process for QC inspections of mechanical repairs or QA inspections for services performed within in the shop. SWD maintains a QC goal of 90% QA/QC inspections on all major repairs. However, there are no tracking capabilities in place to measure compliance.

QA and QC programs are important elements to increase repair quality and efficiency, as well as reducing rework rates and misdiagnosis of mechanical failures. A poorly managed QC program can lead to higher PM vs. DM, and the premature retirement of assets.

The rework rate11 is a metric that can be used to measure the quality of fleet maintenance operations. We were not able to obtain the required data to calculate rework rates from the CCG Faster database due to system limitations. The rework produced by CCG Faster does not distinguish between rework and various services that fall under the same group code.

Criteria
Per SWDs SOP Quality Assurance/Quality Control are to be performed on 90% of the major repairs performed by the Maintenance Unit. Leads and Supervisors review quarterly Inventory Management Reports, and perform daily routine inspections of repairs and completed work on the floor.

Cause
Management does not advocate the County's interest by failing to emphasize effective and efficient operations, as stated in FL.1. Management has not developed a means of monitoring to ensure quality assurance processes are effective.

Management believes that SWD fleet shop personnel are well trained and often work in teams to complete PM checks and complicated repairs. Management believes there is a sense of trust with fleet members. When a new hire starts with the shops they are monitored for the first six months. Once supervisors feel comfortable with the work performed by an individual, QC resides with the individual mechanic.

Routine DM work such as headlights or tire replacements often require little QC checks from Leads but, more complicated repairs are inspected by shop leads. However, we were not able to identify a SOP definition of complicated repairs which are subject to QC checks.

Recommendations
Fleet management should shift priorities from being reactive to being more proactive in its maintenance activities. To accomplish this, the County needs to ensure QC procedures are conducted by management who are committed to efficient and effective operations.

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11 Rework rate: Measures the number of times a piece of equipment is returned for maintenance follow up efforts after work was performed on equipment.

Effects of recommendation - potential cost savings and other impacts

Developing a robust QA/QC program reduces misdiagnosis and re-worked repairs[12]. By decreasing re-work, SWD can reduce its overall maintenance costs, including overtime, and build stronger customer relations. A robust QA/QC program can significantly improve a maintenance facility's PM vs. DM ratios, discussed in FL.2. Cost Savings are therefore captured in that discussion. Cost savings estimates are partially based on support collected from IT systems. As noted in the Methodology section and in the Information Technology section of this report, the accuracy of the potential cost savings calculations may be affected by identified IT general control deficiencies.

King County response

See Appendix I for the County's complete response to this issue.

The County concurs with our recommendation. The County will be using more detailed inspection of repair work to ensure the effectiveness of its repair work.

Auditor's Rejoinder

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

[12] ODOT's Quality Control Program Guidebook

Issue FL.4 – The Solid Waste Division's Fleet Maintenance program does not track the performance measures against maintenance goals established in its Standard Operating Procedures Manual.

Background
We performed a walk-through of the SWD Fleet Maintenance shop. We inquired about any performance metrics, goals or objectives that were tracked by the fleet program. Management discussed internal metrics used for quick analysis; however, no formal tracking system was in place to measure progress.

We requested the SWD Fleet Standard Operating Procedures (SOP) to identify any performance metrics or goals that were to be tracked. Additionally, we requested work order and payroll information to determine SWD's progress toward SOP-stated performance goals. We identified a listing of performance goals; however, no formal tracking system was in place to measure progress. Some performance goals are noted below:

- Productivity Objective Standard: achieve greater than 80% of maintenance unit personnel's time spent on equipment and facilities.
- Quality Objective Standard: provide accountability and procedures for the safe repair of the SWD's equipment.
- Efficiency Objective Standard: keep equipment in a safe and efficient operating condition to achieve designed functions and life, and ensure safe operation.
- Customer Service Objective Standard: provide courteous and effective customer service to SWD staff.
- Work Management System Objective Standard: provide a quality work management process through full use of the Fleet and Facilities Maintenance Management systems and formal work management procedures.
- Safety Objective Standard: provide a safe workplace for maintenance unit employees and customers.
- Preventive Maintenance Objective Standard: execute planned PM program, and manage DM and priority schedules.
- QA/QC standard: it is SWD fleet's goal to perform QA/QC on 90% of work orders.

Once performance goals and their respective progress were identified, we met with shop management to discuss the analysis results.

We compared measured performance against industry benchmarks where we were able to perform the calculation and suggested performance metrics where the underlying data does not allow us to perform calculations. Performance metrics and figures could be lacking because current business processes do not capture the information.

Condition
The SWD Fleet Maintenance program does not apply the performance measures they have developed in managing operations. Management has developed a set of maintenance goals and objectives to track day-to-day operational efficiency and effectiveness of resources. However, management does not track performance against these goals. In addition, management does not have performance metrics to monitor staff outputs.

A lack of measurement of performance standards can lead to a reduced ability for SWD's management to manage the efficiency and effectiveness of Fleet Maintenance activities.

Criteria
Typically, set goals, standards or objectives are developed to maximize a business unit's efficiency. These are then tracked to monitor progress toward that desired state. Using this system of tracking performance standards allows management to lower costs, and increase operational efficiency by quickly identifying areas that require additional attention.

Cause
Fleet management has not made performance measurement and accountability a priority to achieve efficient and effective operations.

Recommendations
Fleet management should make performance measurement and accountability a priority. To accomplish this, the County needs to ensure performance measures are collected, measured, and compared to performance goals by management who are committed to efficient and

effective operations. Specifically, Fleet Management should review business processes to make sure that data input into the CCG faster system (fleet maintenance time and labor tracking application) is captured accurately and should continually monitor data integrity. This will allow management to develop accurate reports to track operational performance. Management should consider co-developing performance metrics with maintenance staff and operations. Metrics to consider are included in Appendix G Suggested Fleet Performance Metrics.

Effects of recommendation - potential cost savings and other impacts
Performance metrics allow management to measure business unit and staff output levels and help management identify troubled areas of operations. This information can be used to improve the overall environment to reduce overtime and maintenance costs and increase management control. For cost savings information please refer to issues FL.2, FL.6, and OT.4.

As noted in the Methodology section and in the Information Technology section of this report, the accuracy of the potential cost savings calculations may be affected by identified IT general control deficiencies.

King County Response

See Appendix I for the County's complete response to this issue.

The County concurs with our recommendations, indicating "as part of the departments' performance measurement program, section level measures are being developed. The division will consider the suggested performance metrics."

Auditor's Rejoinder

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Issue FL.5 – The Solid Waste Division's Fleet Maintenance program does not effectively use damage reports to track damage caused by Fleet Management drivers.

Background
We performed a walk-through of the SWD Fleet Maintenance shop. We noted that the SWD Fleet program performed the majority of demand maintenance (DM) repairs on SWD's tractors and we requested data that tracked DM. We also obtained a damage report and determined that it was not used in any personnel performance measures, and reviews of the information are limited to assessing the completeness of information.

Drivers must report all damage caused or found on all fleet equipment. To keep track of this data, daily reports that itemize and describe the damage are created and sent to the transport and transfer station operations manager, the SWD shop operations manager and all first-line supervisors for review. Once reviewed, supervisors must interview the responsible driver or operator to understand the nature of the damage for performance metrics.

We met with shop management to discuss the nature of DM repairs performed by the fleet program. We reviewed the damage report to gain an understanding of the cause for demand maintenance.

Condition
Line managers do not effectively use damage reports. Drivers are responsible for reporting any and all damage caused to fleet equipment on a daily basis. Once all damage has been identified, photographed, and collected a report is sent to the Transfer Station and Transport Operations Manager, the Maintenance Shop Operations Manager, and all 1st Line Supervisors that deal with fleet. Once the information has been received by the appropriate management, supervisors must interview drivers to understand the nature of the damage. However, currently drivers are not held to any performance measures related to the daily damage reports; the only measurement noted pertains to the completeness of the information provided on the report.

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The ineffective use of the damage report can lead to a lack of performance and accountability. This can also increase avoidable repairs, overtime costs and high demand maintenance ratios, discussed in audit issue FL.2.

Criteria
Daily Damage Reports were implemented by Fleet Maintenance in August of 2008 to hold drivers accountable for avoidable fleet damage..

Cause
Fleet management has not made performance measurement and accountability a priority to achieve efficient and effective operations. Management did not use the damage report as a performance tool Operations management buy-in and development of the process was not executed effectively, which caused a break-down in communications and reduced the utility of the report.

Recommendations

Fleet management should make performance measurement and accountability a priority. To accomplish this, the County needs to ensure performance measures are collected, measured, and compared to performance goals by management who are committed to efficient and effective operations. To effectively implement the program, management should foster communication between maintenance and operations. We recommend two general body meetings with operations and fleet maintenance to discuss high-level metrics, leading practices and identify/rectify issues and improvement areas. Management should also explore incentive programs for reduced damage on equipment and develop a process to effectively capture and take corrective action to address the cause of the damages.

Current policies and procedures related to damage reporting should be followed.

Effects of recommendation - potential cost savings and other impacts

Increased collaboration at the staff level can improve the overall operations. Effective use of damage reports can improve management monitoring and employee care of the equipment. The reports reinforce the importance of accountability for public assets which we think will reduce the amount of DM the County incurs as cited in FL.2.

King County Response

See Appendix I for the County's complete response.

The County indicates "SWD Disagrees that the condition as portrayed in the report currently exists." The County asserts that it has implements several new programs, processes, and reports to correct the noted condition since late 2007. "managers, supervisors and leads monitor daily equipment damage reports, developed in mid 2008, to initiate investigations into preventable equipment damage." The County asserts "when the entire damage tracking system was developed, the entire operations leadership team (managers and supervisors) participated in its development. Implementation was not begun until all members of the leadership team agreed with and understood the process."

The County indicates it does not intend on exploring an incentive program.

Auditor's Rejoinder

We appreciate the County's response. We affirm our finding as we believe there is opportunity to more effectively use these damage reports to improve accountability for damage to equipment. We thank the County for the cooperation and assistance provided by its staff during the audit.

Issue FL.6 – The Solid Waste Division's Fleet Maintenance program charges more time to indirect activities, than the benchmark of 20% established by its Standard Operating Manual, resulting in increased maintenance costs, increased overtime, and higher rates charged to utility customers.

Background

The SWD maintenance system captures hours associated with both direct and indirect time. Direct or "wrench time" relates to all charges made to CCG Faster that are associated with tasks performed on work orders. Indirect time refers to idle time — paid time on the clock waiting for directions or work, or time spent performing administrative, overhead or cleanup tasks. We identified that time charges to direct and indirect codes were captured in the CCG Faster system, but this metric of performance was not monitored.

We met with shop management to discuss this observation. We also compared employee work hours entered in the CCG Faster system (both direct and indirect) to those logged in the payroll system. Using a list of all individuals who charged time to the SWD Fleet Maintenance program, we reconciled direct and indirect-related charges made to CCG Faster and the payroll system for 2005, 2006 and 2007.

Condition

SWD Fleet Maintenance program charges more indirect time than is established by its Standard Operating Manual. For example, in 2005, 2006 and 2007, the SWD Fleet Maintenance program respectively charged an estimated 37%, 32% and 31% of its time to indirect activities instead of the 20% target rate established by its SOP.

Figure FL.4 on the next page provides the breakout of these classifications by year.

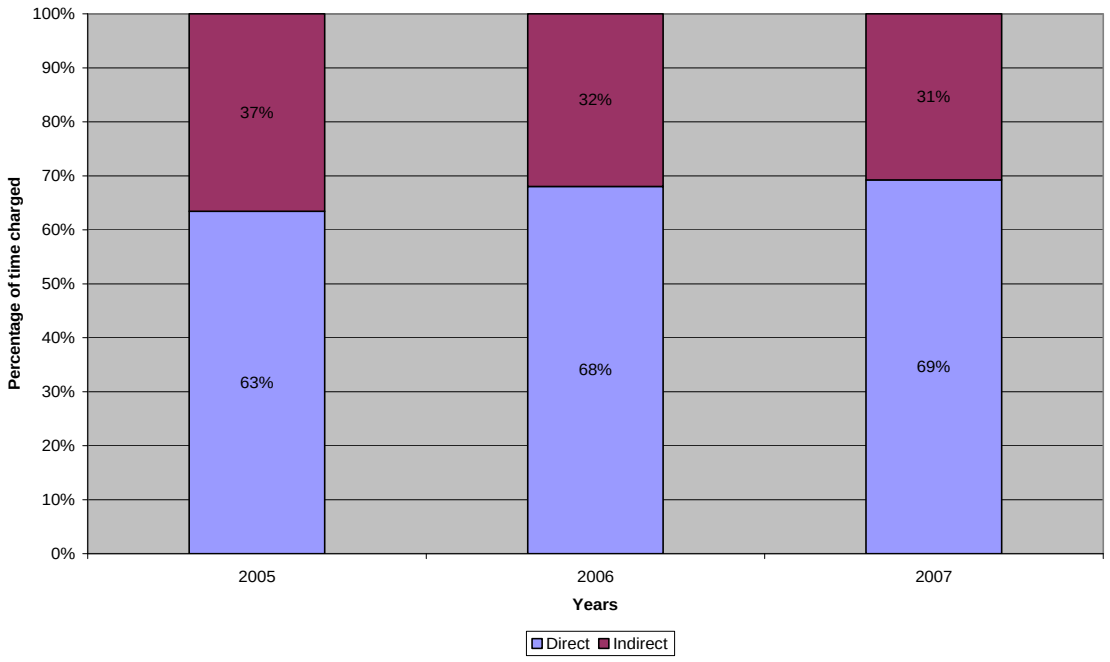


Figure FL- 4– Charges to direct and indirect time by year

Criteria

Based on SWD's own assessment of operational capacity, they have set a target utilization rate of 20% for staff indirect time charged to operations.

Cause

Fleet management has not made performance measurement and accountability a priority to achieve efficient and effective operations. As noted in FL.1, there are nine separate bargaining agreements, each providing specifics times work schedules start and end. The alignment of schedules and workloads may contribute to lower ratios. Extensive planning and coordination related to DM scheduling discussed in audit issue FL.2 increase the need for additional indirect support and increase the likelihood of idle time.

Recommendations

Fleet management should make performance measurement and accountability a priority. To accomplish this, the County needs to ensure performance measures are collected, measured, and compared to performance goals by management who are committed to efficient and effective operations. To effectively implement the program, The SWD Fleet Maintenance program should review their business processes and insert controls to enhance integrity of data inputs, understand the key performance indicators (those metrics management can use to best measure maintenance operations performance), and develop reports to monitor those indicators. Management should involve the maintenance staff when identifying the appropriate performance metrics to measure.

Effects of recommendation – potential cost savings and other impacts

Monitoring staff utilization rates can improve effectiveness of individuals, because it increases accountability of how time is spent. If SWD achieves their goal of 20% indirect time charged by staff, we estimate indirect costs can be reduced by up to $2.2 million over 5 years.

King County Response

See Appendix I for County's complete response.

The County indicates it concurs with our recommendation and feels they have achieved 75% direct labor, just 5% short of their stated performance goal from mid-2008 to mid-2009.

Auditor's Rejoinder

We appreciate the County's response and efforts toward resolving this issue. We thank the County for the cooperation and assistance of its staff during the audit.

Issue FL.7 – The SWD Fleet Maintenance program does not use a life cycle cost model to control maintenance costs, resulting in inefficiencies, increased costs, overtime and higher rates charged to utility customers.

Background

We requested the SWD's fleet asset life cycle cost model to review life expectancies; however, a model was not available. We then met with shop management to discuss SWD's potential use of a life cycle cost model. After initial discussions, we were provided with data downloaded from the system and a listing of all active and inactive rolling fleet owned and operated by the SWD Fleet Maintenance program.

We then performed analytical reviews on the data and cross-referenced the information provided to identify and calculate the cost of all work orders performed, per vehicle. Next, the total cost of work orders per vehicle were compared to the vehicle purchase prices to identify any instances where the cost of maintenance exceeded the cost of purchasing new equipment.

Condition

SWD's Fleet Maintenance methods of measuring life cycle costs are not effective and do not provide management adequate information to make informed and timely purchase vs. maintain decisions for maintenance assets.

SWD fleet equipment is recorded in the Fleet's CCG Faster (fleet maintenance time and labor tracking application). The majority of equipment data is captured, such as make, model, year, purchase price, accumulated maintenance, miles driven and hours used. However, a life cycle cost model is not used to drive the efficient use of equipment and maintenance activities from the data within CCG Faster. Instead, SWD maintains a capital equipment replacement program (CERP). The original cost of rolling assets under the CERP program is $42,733,479, however the model dates back to the 1980's and was established to designate fund allocation to the capital equipment replacement fund. This model does not interface or account for information tracked in CCG Faster – SWD's Fleet Managements Maintenance system. For example, we identified a 2001 Kenworth truck purchased for $115,630 with 332K miles that has had $141,904 of maintenance repairs from 2005 to 2007. This represents maintenance costs of $26,276 in excess of the purchase price, and does not include maintenance activities in 2001-04 or 2008. These costs are excessive compared to the purchase price. A lack of a robust life cycle cost model can lead to maintaining equipment beyond its useful life. In some cases, maintenance costs may surpass the cost of purchasing a new item, resulting in an inefficient use of funds. DM is also increased after the useful life is reached, which can lead to increased overtime charges, unscheduled maintenance and sporadic maintenance workloads, as discussed in audit issue FL.2.

Criteria

Industry practices suggest a life cycle cost model should be in place to enhance the economic use of assets. The model should be used to summarize costs as an economic model of evaluating maintenance vs. purchase decisions and/or other alternative uses for equipment.

Cause

Fleet Maintenance management has not adopted the procedure for the development of a life cycle cost model as used by King County's Fleet Administration.

Management noted that heavy demand on the equipment by the solid waste business has made the life cycle of equipment unpredictable, hence a life cycle cost model has not been created. For example, most long-haul tractors have a life expectancy of 500,000 miles or 10 years. However, the life expectancy is uncertain because of the increased damage and DM required.

Recommendations

We recommend Fleet Management use the MACE life cycle cost model[13] with reasonable adjustments for the higher wear and repair demands expected for municipal solid waste loading, transporting, and unloading considerations. These adjustments can be based on CCG Faster data that captures actual experience and data included from prior years.

Effects of recommendation - potential cost savings and other impacts

[13] Mean Annual Cost Equivalent: A nationally recognized economic model developed by the American Public Works Association, for determining when to replace vehicles. This model is currently used by King County Fleet Administration.

Lack of a robust life cycle cost model can lead to maintaining equipment past its useful life. In some cases, maintenance costs may surpass the cost of purchasing a new item, resulting in an inefficient use of funds. DM is also increased after the useful life is reached, which can lead to increased overtime charges, unscheduled maintenance and sporadic maintenance workloads, as discussed in audit issue FL.2.

A life cycle cost model can help management identify troubled assets for disposal, which, in turn, can reduce overtime and maintenance costs associated with DM. Implementation of a life cycle cost model can also lower capital replacement costs and improve the scheduling of maintenance. Finally, implementation of a life cycle cost model can improve forecasting of capital asset demand and CERP fund investment decisions. Because of the difficulty in estimating the savings associated with the noted benefits, we were unable to calculate the cost savings; however, the benefits SWD realizes from implementing a life cycle cost model will clearly result in cost savings to SWD.

King County Response

See Appendix I for the County's full response to this issue.

The County does not concur with our recommendation.

The County agrees with the function of the life-cycle costing model, but does not agree that it would be an effective replacement of its Capital Equipment Recovery Program fund. Further, the County feels it would be "ineffective to extract information collected by CCG Faster (its current database) to feed another application (MACE) for tracking asset wear and repairs when CCG Faster has this capability."

The County indicates "efforts are underway to utilize this functionality within the CCG Faster application. In addition, where significant capital asset acquisitions are being considered, detailed and extensive life cycle and cost-benefit analysis will continue to be performed."

Auditor's Rejoinder

We appreciate the County's consideration of this issue in expanding the functionality of its CCG Faster system to address this issue. We affirm our finding as the County needs an effective asset monitoring application to ensure repair costs are monitored by asset to improve the effectiveness of its asset acquisition processes. We believe more effective monitoring of all vehicles, not just "significant asset acquisitions" should be subject to monitoring to effectively control excessive repair costs.

Issue FL.8 – The Solid Waste Division can increase the life of the Cedar Hills Regional Landfill two years by relocating Fleet support facilities currently located on the landfill site.

Background
We performed a walk-through of the Cedar Hills Regional Landfill. Through discussions with management, we learned that the approximated closing date for the landfill was 2018. Additionally, we also learned that for convenience and operational purposes SWD has housed the Fleet Maintenance program and overall operations within the permitted airspace of the Cedar Hills Regional Landfill.

We met with SWD management to discuss the life expectancy of the landfill. Management provided us with footprints of the landfill accounting for space occupied by support facilities. Plans regarding the possible relocation of the support facilities have been discussed and potential opportunities to relocate facilities (thereby making space available for waste storage) have been identified. At present no locations have been sited nor have any firm commitments to its relocation been made due to the need to complete environmental reviews.

The landfill has been in operation since the early 1960s and was originally projected to close in 2012. However, through efficiencies and the use of best practices that increase waste density the projected life of the landfill has been extended to 2018.

Condition
The SWD fleet maintenance facility as well as other support facilities are located at Cedar Hills Regional Landfill in Maple Valley, WA. The facilities reside on permitted area space used for disposal of waste. SWD studied their options related to increasing the life of the Cedar Hills landfill and in 2006 documented the results of their study in the Solid Waste Transfer and Waste Management Plan. The plan identified 5 alternatives available to SWD to extend the life of the landfill up to 10.5 years. As of the audit date, SWD has not selected which option they will pursue.

Criteria
Due to the time required to obtain proper permits, stakeholder support and identifying a site that works from an operation prospective, siting a landfill requires years of lead time to complete. Because of lead times and cost associated with siting a landfill, landfill resources should be leveraged to maximize airspace for depositing waste.

Cause
SWD management has not selected which option they will pursue to extend the life of the landfill.

Recommendations
We recommend management select an option that maximizes the use of permitted airspace for depositing waste. Of the available options, those that include moving the support facilities best accomplish the maximization of available airspace.

SWD needs to move quickly because of the time required to obtain proper permits, gain stakeholder support, and identify a suitable alternative site for the support facilities.

Effects of recommendation - potential cost savings and other impacts
If SWD were unable to execute one of the alternatives in the Solid Waste Transfer and Waste Management Plan, before the anticipated 2018 close date, they would no longer be able to deposit waste at the landfill. By moving the support facilities out of the landfill, SWD can extend the life of the landfill two years, which translates into approximately $25 million in costs savings not including the cost of siting the maintenance facilities. Moving the support facilities would involve some capital expenditures; however, we believe the benefits would significantly outweigh the costs.

The costs savings calculation does not include additional methane revenue resulting from additional landfill capacity as discussed in LE.2, which would increase the overall benefit as result of a relocation.

King County response
See Appendix I for the County's full response to this issue.

The County indicates it does not concur with our recommendation. The County indicates that the moving of the facilities to generate airspace is included in two of the five alternatives that have been submitted for environmental review. The County asserts "based on the environmental review, operational feasibility, and cost, a preferred alternative will be identified and recommended to the King County Council for approval" and that "selection of an alternative before completion of the environmental review would be illegal." The County goes on to say that if an alternative were selected that converts the fleet maintenance facility into airspace, such actions would not likely be necessary until 2026 because other currently unutilized sections of the landfill could be accessed prior to this date without disturbing the fleet maintenance operation. The County has also indicated that the SWD has reserved space at the under construction Bow Lake Recycling & Transfer for a fleet maintenance facility."

Auditor Rejoinder

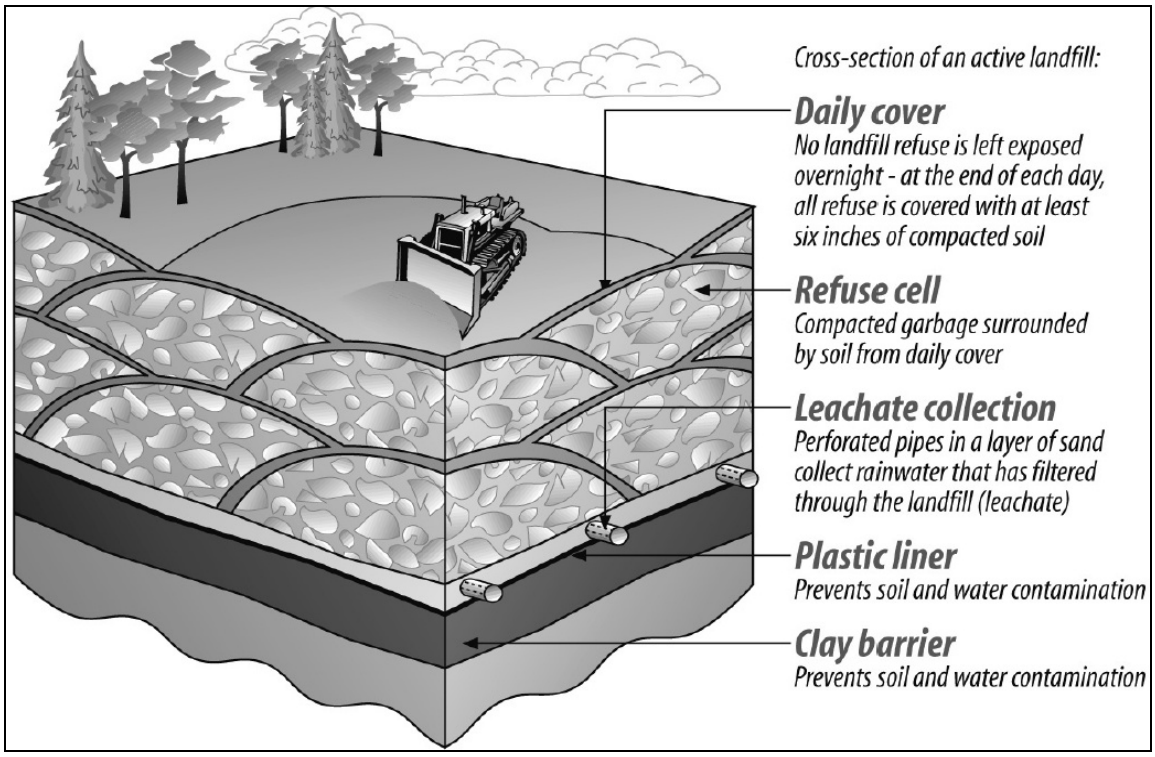
We affirm our recommendation and acknowledge that the County's ability to proceed is dependent on the completion of its environmental review. However, the results of our analysis show that relocation of the fleet facility can extend the life of the landfill and postpone hauling costs which will increase the cost of operations when they occur. The urgency expressed in our recommendation was based on information obtained at the time of the audit which showed the landfill was projected to reach capacity in 2016 – 2018. We acknowledge this date may and should be moved forward if other areas are more readily available for waste acceptance. We thank the County for the cooperation and assistance of its staff during the audit.

Leachate recirculation

Audit area background

Currently, the municipal solid waste managed by the SWD is disposed of at the Cedar Hills Regional Landfill, which is located in Maple Valley approximately 20 miles southeast of Seattle. The landfill has a 920 acres footprint and a total permitted airspace14 of 66 million cubic yards. As of June 30, 2008, approximately 11.6 million cubic yards of airspace remained.

The landfill is comprised of a series of cells that represent permitted land areas that are constructed, filled with waste and capped on an ongoing basis. The Cedar Hills site has ten cells and the most recent are named by area. Currently, the active cell receiving waste is Area 6. The SWD is expected to complete construction of a new cell (Area 7) in 2009. Area 5 is not in use but has not been formally closed. It is currently covered by a temporary two-foot thick soil cap. As waste in this cell biodegrades, the upper surface will settle and new airspace will be created allowing for the disposal of even more waste. After Areas 6 and 7 are filled, the SWD plans to remove Area 5's temporary cap and use this airspace prior to closing the landfill. Areas 6 and 7 may also be subject to this same process.



LE-1 Cross Sectional View of Cedar Hills Regional Landfill infrastructure

A simplified, cross-sectional view of the landfill is presented in Figure LE-1 above. As shown in Figure LE-1, cells have engineering controls such as impermeable liners, soil and vegetative caps and leachate collection systems. The design and extent of these systems depend upon the date at which the cells were constructed and the regulatory requirements that existed at that time. For example, the oldest areas of the landfill do not have liners at their base because its construction pre-dates the regulatory requirement.

[14] Permitted airspace is a defined three-dimensional volume that the regulator has approved for waste acceptance. Permitted airspace defines the size of the landfill.

Leachate is defined by the US Environmental Protection Agency as, “Water that collects contaminants as it trickles through wastes…” At landfill locations, this material has the potential to contaminate groundwater resources if proper engineering controls are not installed and maintained. Leachate collection systems at the Cedar Hills Regional Landfill facility collect leachate from the base of the landfill cells where it is piped to two storage ponds located at the south end of the facility. Here it is treated and then discharged under permit to the King County WTD's sanitary sewer system. From 2005 through 2007, the volume of the discharge ranged from 197 to 242 million gallons per year. King County WTD has charged Cedar Hills $3.17 million to treat this leachate during this same period. This cost averages to $1.057 million per year.

All landfill cells are connected to a landfill gas collection system that consists of buried slotted pipes that are placed under a vacuum with the aid of a blower. The gases generated by a landfill as the wastes decay are comprised of water vapor, methane and other greenhouse gases. The purpose of the landfill gas collection system is to prevent the pressure buildup of these gases to maintain the integrity of the landfill caps and liners. In the past, these gases would be collected and burned (or flared) to ensure compliance with air emission regulations. In the past year, the SWD and its third-party consultant (Bio Energy) have constructed and implemented a capital project that is collecting the gas, removing impurities and piping the cleansed gas into a natural gas utility pipeline. The utility company (Williams Northwest) will pay for the product based on the volume of gas delivered. The SWD’s current estimate of the annual revenue it expects to receive from the sale of landfill gas is $1.022 million.

The collection of landfill gas extends beyond the operational life of the landfill. However, at some point in the future the quantity and quality of the gas will be insufficient to offset the cost of scrubbing the gas and maintaining this set of equipment. Instead, during this second stage, the gas will once again be flared to meet air emission regulations at a cost to the SWD. At an even later date, when the gas quantity and quality finally fall below acceptable thresholds, regulations allow it to be directly vented to the atmosphere. Due to these dynamics, the greatest landfill gas revenue is achieved by collecting as much of the gas as possible, as quickly as possible and limiting the late-stage time period when emissions are addressed by flaring.

Issues LE.1– The Solid Waste Division can extend the life of the Cedar Hills Landfill which can result in lower operating costs and generate revenue, resulting in lower rates charge to landfill customers.

We identified three issues related to leachate recirculation:

Disposal costs: leachate disposal costs can be reduced by recirculating leachate.

Gas revenue: landfill gas sales revenues can be increased by recirculating leachate.

Airspace creation: Cedar Hills Regional Landfill's life can be extended by recirculating leachate.

Background
As part of our risk-based approach, Ernst & Young conducted a high-level review of operations managed by the SWD. With regard to the management of solid waste disposal facilities, a key consideration in evaluating operational efficiency is the density of the waste placed in the landfill. By increasing the density, SWD can dispose of more waste. This translates to improved performance. The SWD has identified a density of 1,300 pounds per cubic yard (lbs/cyd) for future planning purposes. Ernst & Young experience with waste management firms is that densities are commonly greater than 1,450 lbs/cyd.

Condition
No infrastructure or processes are currently in place to recirculate the leachate back into the landfill. The landfill does not currently capture and sell the methane byproduct that is generated by the garbage in the landfill.

Criteria
Industry practice suggests that you recirculate as much leachate as possible within the constraints of technical and regulatory requirements.

Cause
Initial discussions with SWD indicated that some of the personnel believed recirculation of leachate is not allowed under WAC regulations. However, WAC 173-351-200(9) specifically permits leachate recirculation under the name of "bioreactor" (i.e., enhanced degradation) landfills. The pertinent section on operating criteria on liquid restrictions states, “Bulk or non-containerized liquid waste may not be placed in MSWLF units unless: (ii) the waste is leachate or gas condensate derived from the MSWLF unit, or water added in a controlled fashion and necessary for enhancing decomposition of solid waste, as approved during the permitting process of WAC 173-351-700, whether it is a new or existing MSLF or lateral expansion.”

A second regulation affecting leachate recirculation is WAC 173-303-665(2)(a)(ii) that specifies design requirements. With respect to the amount of leachate that may be present at the base of the landfill it is noted: *“… the department will specify design and operating conditions in the permit to ensure that the leachate depth over the liner does not exceed 30 cm (one foot).”* The SWD has indicated a concern that the pursuit of recirculation could violate the one-foot limit. However, sumps and pumps are located at the base of the landfill and may control this risk. Floats connected to these systems can be set to ensure excess leachate would be removed as necessary to maintain compliance.

Furthermore, it was noted that the one-foot rule was implemented while Area 4 was active. It therefore applies to only Areas 5, 6 and 7. Under the former rule (found in WAC 173-304-460(3)(b)(ii)), a two-foot leachate depth at the bottom of the landfill is allowed. Therefore, if recirculation is being pursued, more leeway could be possible by targeting older lined areas.

A final concern of engineers is avoiding the clogging of gas collection systems with recirculated leachate. As landfill waste decays and the landfill subsides, dips in piping can pool liquids and this can interrupt the collection of landfill gas. However, this situation is overcome across the solid waste industry by installing additional gas collection piping with the appropriate drainage pattern as needed.

Recommendations
Based on a preliminary analysis, we recommend that the SWD conduct an engineering analysis to determine the best means of securing potential costs savings from recirculating leachate. Such an analysis would include a detailed analysis of multiple factors affecting the costs to design, permit, construct, and operate a leachate recirculation system. For new cells (e.g. Area 7), construction costs can be minimized by including the infrastructure in the area as it is built. Area 5 also represents a less costly option because it is currently only covered with a temporary cap. The future recirculation analysis would capture these considerations and complex modeling of the biological breakdown of wastes to determine the speed and efficiencies to be expected based on site-specific parameters.

Effects of recommendation - potential cost savings and other impacts
Savings from leachate recirculation are realized through three potential mechanisms. First, recirculation lowers discharge fees because a larger quantity of the water is evaporated or left in the landfill and less is discharged to the sewer. Secondly, at locations where an active landfill gas collection waste-to-energy system is in place (as is now the case at the Cedar Hills site), the additional gas generated from the more robust breakdown of the waste increases the volume of landfill gas available for sale. Lastly, recirculation enhances the breakdown of waste and, therefore, creates additional airspace that can be used to dispose of additional waste under the existing permit. Accordingly, the operational life of the landfill can be extended.

All of these dynamics serve to benefit the ratepayer by reducing fees. The final determination of cost savings generated from leachate recirculation is best assessed through the completion of a full engineering analysis. Such efforts are beyond the scope of this audit. However, Ernst & Young has researched current literature to gather information relating to other facilities where recirculation is being conducted.

Based on this information, and the use of simplifying assumptions, Ernst & Young has projected a potential savings of $1,850,000 through the reduction of the leachate discharge volume by 50% over a five year period. Furthermore, additional revenues of $1,150,000 to $3,150,000 are estimated over a future five-year period from increased methane sales.

Methane sales revenues and savings generated through the increase in airspace are dependent upon the areas of the landfill that are equipped with leachate recirculation infrastructure. Estimates restricted to Area 5 only indicate $10,726,000 in savings could be generated through the creation of additional airspace and extension of the life of the existing landfill. Projections extending over Areas 5, 6, and 7 are estimated at $29,250.000. These savings do not include costs associated with the installation and maintenance of the leachate recirculation systems.

To achieve the cost savings associated with the extension of landfill life cited above, the Solid Waste Division will need to gain acceptance of permit modifications by regulatory authorities. It is acknowledged that to garner such approvals future engineering studies will be necessary and it is possible that conditions will be imposed that limit the full value of this benefit from being realized. It is also possible that required environmental controls may indicate recirculation efforts to be cost prohibitive in some areas. However, based on the data currently available we believe the economic benefits achieved through the prudent application of leachate recirculation will generally exceed anticipated costs.

King County response
See Appendix I for the County's complete response.

The County indicates it does concur with our recommendation. However, the County has indicated strong reservations associated with the pursuit of leachate recirculation due to the potential development of odor concerns and limitations on its effectiveness due to the high moisture levels already present in the landfill. The County also indicates concerns that the cost to address these items could significantly detract from the savings indicated in the prior discussion. The County has indicated that it will engage in a leachate recirculation study to further evaluate these considerations.

Auditor Rejoinder
We affirm our recommendation and acknowledge the County's prudent concerns regarding odor control and moisture level controls. While we accept that the pursuit of these savings is not without technical challenges, we anticipate that odor and moisture concerns can be controlled by the discharge of the leachate under temporary caps and the maintenance of existing gas systems. Moisture issues may also require suspension or delay of recirculation efforts after high rain events or in certain seasons. Additional managerial or technical controls

may also be necessary to address other currently unidentified considerations. We support the County's plan to initiate a study to capture these needs, ensure future compliance and best develop a means of achieving future savings to benefit the ratepayers.

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Overtime Expenses

Audit area background

WTD

The WTD consists of two operating segments, the east and west, as well as the administrative and engineering staff providing service to the entire utility. This latter group is located downtown in the King Street Center building. The east and west business segments consist of a primary water treatment plant and several pump stations. Staffing at each of these areas differs based on the needs of the work being performed.

WTD has contracts with five unions with each union, encompassing different positions within WTD. The employees' working conditions are dictated under their union's contract, which is negotiated with WTD. Each union has slightly differing policies regarding what constitutes overtime and the overtime accrual processes.

In general, employees who work hourly are eligible for overtime payments when they have worked more than their standard shift schedule, which is 40 hours during a week. This does not include any salaried employees, which usually includes supervisors and managers.

Overtime types and causes
All overtime-eligible employees have the option to request that their overtime be considered compensatory time (comp time). Where normal overtime is paid when earned, comp time can be banked by employees and used during weeks they may be short of the standard 40 hours. For example, if an employee who opts to bank his overtime as comp time works 41 hours during a week, the 1 hour of overtime is banked as 1.5 hours of comp time because it would have been paid at 1.5 times the employee's pay rate as overtime. Should that employee then work only 39 hours the next week, he can use his banked comp time to make up the difference up to 40 hours for that week. He would have 0.5 hours of comp time left to use at a later date.

To accommodate the functions of the wastewater treatment plants, shift crews work several different schedules. There are four shift crews at each plant: A, B, C and D shifts. The scheduling of the shifts is negotiated within the union contracts, and WTD is required to accommodate the schedules defined by the contracts when developing its staffing plans for work areas. These shift crew schedules are designed so incurring overtime is necessary, since crews are sometimes required to work more than 40 hours a week during the year. Each shift works four consecutive days at 11.7 hours per day, with the next four consecutive days off. This results in "long" weeks where 46.8 hours are worked with 6.8 of those hours considered overtime. Other weeks are short weeks where only 35.1 hours are worked.

The union contracts specify that the overtime worked specifically on a shift schedule is classified as comp time; meaning the "long" weeks of 46.8 hours include 6.8 hours of overtime paid at a 1.5 times the employee's standard hourly rate. That overtime is banked as comp time and paid to them during weeks the schedule has them working less than 40 hours. However, the way the schedule is set up, a shift employee will always earn more comp time during the long weeks than can be used during short weeks.

Additional types of overtime include:

- Overtime paid at regular rate – overtime incurred when an employee's normal shift is less than 40 hours a week and that employee worked more hours than their normal shift, but less than 40 hours for the week. For example, if an employee's shift is 7 hours, 5 days a week and one day he works 8 hours, that extra hour would be considered overtime relative to the employee's normal schedule, but would be paid at the employee's regular rate since the total hours for that week were still less than 40, adding up to 36.
- Comp time paid at regular rate — Similar to overtime paid at regular rate, but instead of the overtime being paid, the employee opts to bank the time as comp time.
- Overtime for training — overtime incurred when an employee is required to come in for training outside their normal shift.

Overtime planning and budgeting
WTD understands the annual amount of overtime costs includes expectations of what is to be paid from the shift schedule comp time, as well as holiday overtime, since operations must continue during holidays. WTD also plans for a percentage of people to call in sick and use vacation time, creating a need for others to incur overtime to cover these occurrences.

The process for budgeting overtime costs does not consider projections; it is simply a calculation using the previous year's budget and multiplying by an inflationary percentage typically between 2% to 5%. There does not appear to be sufficient consideration of the previous year's expenditures when the budget is developed. Because of this, the division frequently overruns its overtime budget; however, the expenditures for other labor costs are significantly under budget. This stems from the vacancy rate in the budgeting process, meaning the actual experienced vacancies are more than the budgeted amount.

Overtime authorization
The overtime approval process varies throughout the WTD. However, in most instances, overtime is approved in advance, unless there is an emergency or mitigating circumstance. Any instances of overtime incurred without prior approval generally must be communicated to the supervisor or manager as soon as possible. In most cases, a written request or documentation regarding the nature of the overtime must follow the occurrence.

At the water treatment plants the plant manager or the assistant manager's prior approval is required for all instances of overtime, except in the case of emergencies. There are limited circumstances in which a supervisor may approve overtime. For emergencies in which prior approval is not possible, the supervisor may authorize, or an employee on call may perform, the necessary overtime to respond to the incident. However, the plant manager is notified of the need and justification of the overtime via phone or email as it occurs, or soon thereafter, generally the next day. Emergency situations in which this process would be used include times of heavy rainfall, a quick snow melt with larger than average amounts of water, malfunctions with plant equipment and other events that require immediate attention.

SWD

SWD consists of the Cedar Hills Regional Landfill, eight transfer stations located around the Puget Sound area and administrative and engineering staff located downtown in the King Street Center building. Like WTD, SWD's employees are represented by nine unions, whose contracts dictate what constitutes overtime and overtime accrual. Hourly employees are eligible for overtime, with overtime considered to be time worked beyond the employee's normal shift schedule.

Overtime is used to fill vacancies from employee absences, such as sick leave or vacation. Other occasions when overtime can be used include special projects, attending training and meetings and handling unexpected variations in the amount of solid waste being processed.

Overtime Types and Causes
Employees eligible for overtime may also choose to use a comp time option under their union contracts; however, unlike WTD, there is no shift scheduling that requires using comp time. Also, unlike WTD, there are no instances of overtime for training. All other types of overtime are similar to those found in WTD.

The primary source of overtime results from transfer station, transportation and shop operations with employee positions in the Teamsters Local 174, the Joint Crafts Council and the International Union of Operating Engineers Unions. Shop overtime largely stems from scheduling, which does not include weekends and holidays as part of its regular weekly schedule, even though it is regularly open on the weekends. Therefore, any hours worked on weekends are automatically overtime. Employees are given the option to sign up for this overtime work. Transfer stations and the transportation employees incur overtime because of logistical issues, such as loads arriving late to the stations.

Overtime Planning and Budgeting
Budgeting within SWD for overtime (as well as other budgets) is done by King County's OMB. The budgeting process does not consider projections; it is simply a calculation using the previous year's budget multiplied by an inflationary percentage that is typically between 2% to 5%. There does not appear to be any consideration of the previous year's expenditures when the budget is developed. Because of this, the division frequently overruns its budget for overtime, as well as general employee labor costs.

To control staffing and overtime issues with the transfer stations and transportation operations, the division uses a detailed staffing model to determine how many employees will likely be required to work for the upcoming week. It takes into consideration employees using vacation time, sick leave and an estimated number of employees who will call in sick each day. With this information, SWD determines whether it will need employees to work overtime, and how much overtime is expected.

Overtime authorization

Scheduled overtime is preapproved via the scheduling process. Supervisors are notified after the fact for overtime not scheduled but recorded by employees. Supervisors are responsible for two to three transfer stations and, because of this, they are not always present to monitor overtime. In these instances, Leads are able to authorize overtime and are held accountable when the supervisor approves the overtime time submittals. Leads are experienced technicians who supervise other employees on a task-to-task level, while supervisors generally have more managerial responsibilities.

If a supervisor feels the overtime was unwarranted, they may ask about the recorded overtime and, if appropriate, proceed with disciplinary actions. However, the SWD is required to pay the disputed amount per The Fair Labor Standards Act and the Washington State Minimum Wage Act. In other words, employees are working unauthorized overtime and being paid for the hours, even though the hours were not approved. This is a frequent occurrence because many of the sites are not monitored or supervised. Supervisors and managers have limited means of monitoring activities in the transfer stations when they are not present due to various factors, including a lack of on-site cameras and current limitations surrounding its GPS system.

Issues and recommendations – approving overtime

Issue OT.1 Water Treatment Division standard shift schedules are structured to include overtime at time and one-half, creating increased costs to ratepayers.

During our analysis of documents received from WTD and discussions with WTD personnel, we found that a large portion of overtime expenses are due to comp time. Upon further investigation, we found the majority of comp time resulted from water treatment plant shift crews. These crews are subject to a schedule defined within their union contract requiring they work four days with the following four days off. This schedule facilitates the night shifts necessary to run the treatment plants, and builds in overtime, which is then taken as comp time per the union contract.

Our analysis found that the shift schedule results in an excessive amount of comp time. King County employees could accept a work schedule that results in an average of 40 hours per week, with no overtime. There are currently enough shift schedule options to allow both the operations to remain viable and the employees to work an average of 40 hours per week. This would result in both a fair wage and an operation suitable to the ratepayer's needs.

Condition
Current scheduling practices for shift crews involve alternating 46.8 and 35.1 hour weeks, generating 6.8 hours of comp time paid at time and one-half every two week period. As discussed above, employees are working an average of 40 hours per week, but are being paid much more than a normal 40-hour workweek.

Comp time paid in 2005, 2006 and 2007 totaled $1,308,374. WTD is an enterprise fund and operates under funds raised through ratepayers. Reducing comp time spending can result in lower rates for ratepayers.

Criteria

Shift crew scheduling should utilize standardized work weeks resulting in 40 hour weeks for employees. This will reduce overtime expenditures.

Cause
The existing union contract (International Local 925) requires the current scheduling for shift crews and allows the option for comp time.

Recommendations
Ernst & Young recommends that WTD seek to negotiate the elimination of unbalanced shifts that result in comp time from long and short weeks, and only include shifts that result in 40-hour workweeks. The current schedule is creating an added burden to the WTD ratepayers. Also, the current economic environment has challenged King County to implement extraordinary cost-saving measures. Removing the unbalanced shifts will save funding without reducing employee hours.

Effects of recommendation - potential cost savings and other impacts
Our analysis of the current schedule led to the creation of an alternative method of scheduling hours to reduce the overtime worked by shift crews. Using a schedule that evenly distributes time worked by shift crews during the week would significantly reduce the amount of overtime, thus reducing the amount of comp time and, therefore, reducing overtime expense. As stated above, WTD is required to follow this schedule due to its current negotiated contract with Local 925. We estimate the five-year potential cost saving is $800,000. Cost savings estimates are partially based on support collected from IT systems. As noted in the Methodology section and in the Information Technology section of this report, the accuracy of the potential cost savings calculations may be affected by identified IT general control deficiencies.

King County response
King County concurs with the recommendation. Refer to Appendix I for the County's complete response.

Issue OT.2 - The budgeting of vacant positions at the Water Treatment Division is historically understated, resulting in excessive budget allocations and increased rates charged to utility customers.

Background

During our analysis of WTD's overtime expenditures, we calculated the variance of budget-to-actual costs for overtime at the wastewater treatment plants and found the division consistently overruns its overtime budget. However, after discussing this issue with the division, we found that budgeting for overtime each year is a simple calculation using the prior year's budget, escalated by a mandated escalation factor. Historical expenses and actual experience, along with current budgetary considerations such as expected vacancy rates, are not considered. This results in apparently unrealistic overtime budgets.

The vacancy rate is the difference between the number of employees that the Department is authorized to run operations and the number of employees the Department actually employs. This gap is measured as a "vacancy rate" applied to the Department's budget.

Understating the vacancy rate contributes to excessive budget allocations for associated operational costs such as salaries and benefits and certain central cost allocations. If the vacancy rate is less than the actual vacancy rate experienced by the Division, the budget allocated to the Division is higher to cover the cost of positions that are not filled during the year. WTD is an enterprise fund and operates under funds raised through rate payers. Rates are determined based on the annual adopted budget for the year and are overstated when the vacancy rate is understated (unfilled positions are built into the budget and not filled during the year).

We found that spending on labor costs other than overtime, including salaries and benefits, was consistently under budget because WTD's vacancy rate is historically understated. Over the four year period 2005 through 2008 WTD budgeted for annual average vacancy rates of two to four percent but the experienced vacancy rates were significantly higher (from 2003-2008 the average vacancy rates has been from 5-8%).

Additionally, certain central cost allocations (Personnel Services, Bus Pass Subsidy, Countywide Mail Service, and Records Management) are charged based on budgeted FTEs. Because WTD's budgeted FTEs are 598.7 and their actual FTEs are significantly lower, WTD is overcharged for services provided by central county for more FTEs than they actually have. (Note that we are also recommending that central service allocations are adjusted for actual experience, see Issue OH.1 for additional detail.)

We used the WTD-provided data to analyze the historical vacancy rate and found that the number of vacant positions had increased from 32 to 45 from 2005-2008. Ernst & Young also requested labor cost information for each low org within the division to determine the extent of the variances between budgets and actual expenditures. Finally, we used vacancy data to analyze central cost allocations based on actual FTEs instead of budgeted FTEs.

This issue is based on a portion of WTD's total budget, focusing on overtime and labor related line items.

Condition

WTD applies an understated vacancy rate in determining its budgets. Therefore, budgets for labor related costs are inflated by unfilled positions. This results in budgeted costs that exceed what is necessary to maintain the actual number of people the Division has hired to maintain operations. These very budgets are the basis for the rates the Division charges ratepayers, resulting in rates that exceed the rates that would be established if the Division based their calculations on estimates that approximated actual costs.

In addition, overhead costs are charged by King County Central Services and Finance and Business Operations. These costs are determined based on the Division's budget. As the Division budgeted for more personnel than they employed, the costs that were allocated are also overstated, resulting in an additional layer of cost the ratepayers must cover in the rates they pay the County.

Criteria

WTD's budgeting process should reflect current need and include vacancy rates that consider history and also any factors forecast for the budget period.

Cause
WTD considers only its historical budgeted vacancy rates without considering its actual experienced vacancy rates.

Recommendations
Ernst & Young recommend that WTD use a higher vacancy rate in their budgeting process to determine the "Budgeted Salary Savings" figure to better reflect current division needs. WTD should prepare an analysis of its annual budgeted vacancy rate including review of historical vacancy rates, with consideration of other factors forecast for the upcoming budgetary period.

Effects of recommendation – potential cost savings and/or other impacts
Implementation of the recommendations will result in rates charged to ratepayers that more accurately reflect the actual costs incurred by the Division. While we cannot estimate the actual affect on the individual rates charged to customers, as rates charged vary widely, we estimate that over five years the Division's budgeted costs used to determine rates can be reduced by a potential $5,600,000 , combined with an additional reduction in the overhead charged by King County Central Services of approximately $250,000 [15]. Note that while WTD overstates the labor costs they budget each year, it also understates its overtime budget as well (see issue OT.3 below for details) which was considered as part of the potential budget reduction. Budget reductions to the Division are estimates partially based on support collected from IT systems. As noted in the Methodology section and in the Information Technology section of this report, the accuracy of the potential budget reduction calculations may be affected by identified IT general control deficiencies.

King County response
King County concurs with the recommendation. Refer to Appendix I for the County's complete response.

[15] These amounts are based on the number of employees actually hired by the Division at the time of testing. Should the Division need to hire additional staff to reduce the amount of overtime they are experiencing, these amounts of cost reduction affecting rates charged would decrease from those provided.

Issue OT.3 Overtime budgets are based on an estimated inflationary factor rather than actual rates experienced and forecasts for the Water Treatment and Solid Waste Divisions, contrary to best practices.

Background

During our analysis of overtime, Ernst & Young reviewed overtime budgeting and actual data and found that both SWD and WTD had significant overtime budget overruns during each year from 2005 – 07. During the period, WTD only budgeted approximately 70% - 80% of their actual overtime during the period, and SWD budgeted only 30%-45% of actual overtime during the same period. Budgeted overtime cost versus actual overtime costs are presented below:

WTD		Budget	Actual	Variance
	2005	$668,802	$826,309	($157,507)
	2006	$716,352	$976,864	($260,512)
	2007	$730,681	$1,042,967	($312,286)

SWD		Budget	Actual	Variance
	2005	$620,407	$2,065,581	($1,445,174)
	2006	$826,608	$1,991,074	($1,164,466)
	2007	$865,128	$1,926,041	($1,060,913)

WTD and SWD each develop their own budget using budgetary assumptions provided by King County OMB. The overtime budget is increased each year by an inflationary factor between 2% to 5%. This can create unrealistic budgetary overtime targets. An adequate budgetary system should include reasonable, achievable thresholds.

Condition

WTD and SWD budgets for overtime are set by adjusting the prior year budget by a predetermined escalation rate that does not include any projections of actual need. As a result, actual overtime expenditures exceed budget estimates by 124% - 143% for WTD and 223% - 333% for the SWD during the years 2005 - 2007.

Criteria

Budgeted overtime should be based on projections derived from historical trends and professional judgment.

The escalation rate should not be used for overtime budgeting. WTD and SWD should be permitted to take a more analytical approach in setting the overtime budget by looking at factors such as historical trend, expectations for the upcoming year, and internal management operational goals.

Cause

WTD and SWD are allowed an inflationary percentage of increase when setting the overtime budget. The inflationary escalation factor is applied to the prior period budget to arrive at the budget.

Recommendations

The overtime budgeting process should be adjusted in consideration of analysis of current conditions and expenditure levels so the following year's budget more accurately reflects expected actual expenditures. An analytical approach in setting the overtime budget may consider factors such as historical trends, expectations for the upcoming year and internal management operational goals.

Effects of recommendation - potential cost savings and other impacts

The recommendations will result in assurance that the rates charged to ratepayers that more accurately reflect the actual costs incurred by the Division. While we cannot estimate the actual effect on the individual rates charged to customers, as rates charged vary widely, we have included the estimate the effects on WTD in our Effect of recommendation in OT.2. Both WTD and SWD will have more accurate budgetary targets for overtime and an improved budgeting system which will allow the division managers to properly apply reporting capabilities such as a comparison of budget to actual expenditures.

King County response
King County concurs with the recommendation. Refer to Appendix I for the County's complete response.

Issue OT.4 Solid Waste Division employees incur significant amounts of unmonitored overtime hours, which may result in increased costs to ratepayers.

Background
Our analysis of SWD's overtime expenditures found that the operational areas with the most overtime costs were the transfer stations and transportation. Discussions of this issue with SWD personnel and an analysis of the overtime procedures indicate a lack of formal policies regarding advance approval of overtime and payment of unauthorized overtime. We also note that the division's ability to supervise overtime for these two functions is limited due to several factors.

For the transfer stations, one supervisor is responsible for two or three transfer stations and, as such, cannot adequately supervise all instances where overtime is reported. Additionally, union contracts do not permit the installation of cameras on the property to monitor employee activity which would improve management oversight. Because the transfer stations must accommodate customers and transactions that may require overtime on short notice, and without prior approval, a lack of supervision allows for potential abuse of recording overtime when it has not been properly earned or preauthorized.

For the transportation area, which includes the truck drivers who transport waste from the transfer stations to the landfill, a GPS monitoring system is being used. However, this system is not able to provide the necessary information to effectively monitor truck activity and allow for analysis of proper use of time. This also creates opportunities for abuses of overtime. Enhancements to the system would improve management oversight of transportation activity.

Condition
The majority of overtime originates in the transfer and transportation operational areas. A formal policy about overtime does not exist which would provide managements' review and approval of overtime before it is incurred and to ensure adequate documentation is retained to evidence review of the overtime. Additionally, SWD is currently unable to install cameras at its transfer stations because of union restrictions. Furthermore, the existing GPS system lacks the functionality to aid in robust monitoring of driver locations. This combination of factors increases the potential for employee abuse of overtime expenditures without management detection.

Transfer and transportation organizations consistently exceeded budgeted overtime. In 2005, 2006 and 2007, these organizations accounted for 63%, 57% and 58% of total overtime spending, respectively. SWD is an enterprise fund and operates under funds raised from ratepayers. Increasing operational efficiencies, such as reducing overtime spending, can result in lower rates. Also, gaps in management monitoring of employee activities increases the risk of operational inefficiencies.

Criteria

A formal policy outlining criteria over expected and acceptable overtime use should be in place for the Transfer and Transportation low orgs. The policy should include disciplinary action for violations and include procedures for approval of exceptions to the policy.

In addition, SWD should be able to monitor the security and activities of its employees through use of security cameras and updated GPS system.

Cause
Lack of management oversight, a formal, enforced overtime policy and direct supervisors, allows the transfer and transportation employees to incur unmonitored overtime. The absence of a formal, documented policy and a designated supervisor at each transfer station may have caused the overtime overrun spending from 2005-07. Existing union contracts prohibit the installation of security cameras at SWD facilities. The GPS system currently in use is outdated and lacks the ability to confirm the whereabouts of SWD drivers.

Recommendations
We recommend that SWD develop and implement formal documented overtime policies regarding the use and payment of unauthorized overtime. The policy should state the circumstances in which overtime may be incurred without preauthorization, and should also state that overtime worked that is not in accordance with the policy will not be paid. We also recommend that the Division negotiate the installation of cameras at the transfer stations into their bargaining agreements as a management right. This will increase safety for the employees and also allow for increased management oversight of employee labor hours. We believe the installation of cameras is not a

change in working conditions and therefore should not be a negotiable item. Finally, we recommend that the division update its GPS technology in order to better monitor truck drivers.

Effects of recommendation - potential cost savings other impacts

Our audit results indicate that division overtime will be reduced with additional oversight and monitoring tools. We did not examine the reasons why overtime was incurred in all cases, therefore we cannot quantify an amount of overtime that could be avoided by effective monitoring versus overtime that is necessary and could be eliminated by using additional staff paid at straight-time.

King County response

King County does not concur with the recommendation, indicating that the majority of overtime in the transfer and transportation sections is to provide coverage for employees who are on leave, and that an overtime range of 10 to 15 percent of total salaries is an acceptable target. Refer to Appendix I for the County's complete response.

Auditor's rejoinder

We appreciate the County's response and cooperation during the audit. The County states that an overtime range of 10 to 15 percent of total salaries is acceptable, but this is much higher than percentages experienced by other departments within the division. We believe that the division can achieve cost savings via decreased overtime expense by increasing its oversight of employee activities.

Biogas use

Audit area background

The WTD operates two water treatment plants (the South Plant and the West Point Plant) that collect and process wastewater, generating solid wastes (sludge). These solids are routed to digesters that break down these solid wastes using biological processes. This biological process generates off-gases (biogas) that are primarily a mix of methane and carbon dioxide.

Common industry practice is to collect the gas and use it as a fuel source to operate plant equipment and generate electricity. Because the primary component of both biogas and natural gas is methane, multiple potential uses are available. Common examples include the use of biogas to fuel pumps, generate heat and fuel generators for electrical production. Methane is a greenhouse gas that is 21 times more harmful than carbon dioxide. To negate these effects, unused biogas is commonly burned (i.e., "flared") prior to release.

The South Plant uses its biogas to operate a cogeneration facility to generate both electricity and heat. The infrastructure also has the flexibility to cleanse or "scrub" the gas and direct it to the local gas pipeline, where it is sold as a commodity. The flexibility of the design at the South Plant is seen as a best practice because it allows controllers to direct the biogas stream where the maximum benefit can be realized. For example, in the summer when the plant's electrical demands may cause the local utility to impose an electrical surcharge fee, the biogas can be fed to the cogeneration unit to allow the plant to create its own electricity.

King County's West Point Plant does not currently have the ability to use or reclaim methane that the South Plant currently has. For this reason, biogas use was selected as a focus area to further evaluate opportunities for improved efficiencies. The WTD has been engaged in an effort to implement a waste-to-energy project at the West Point Plant for several years. The issues identified below pertain not only to the gas use, but also to the new project.

Biogas issues discussed in this report all relate to the planned West Point waste-to-energy project. As discussed in greater detail under the following biogas issues, the WTD failed to gain an accurate understanding the degree of uncertainty around the initial project estimates (see issue BG.1). This, in part, led to poor decisions regarding the prepurchase of equipment (see BG.2) and potential conflicts with existing policies (see BG.3). Although the project is now likely to operate at a loss in comparison to a "no action" alternative, it is being pursued because of the ecological and energy independence attribute it brings to the county. Recommendations included in this section include actions to better understand future project cost uncertainties and account for this uncertainty in the management of future projects. Means of limiting future operational losses through revenue generation are also recommended (see BG.4).

Issue BG.1: Lack of adequate project planning has resulted in a tripling of estimated construction costs for the waste-to-energy project from $6.1 million to $17 million between 2004 and 2008.

Background
In 2004, the West Point Plant waste-to-energy 30% design report was submitted by the contractor to the county. The power generation construction cost estimate was $6.1 million. Significant issues included the determination that the system would need to flare a portion of the digester gas to maintain the load consistency required for operation. The total project estimate for construction, generators (now purchased) and gas line extension (also purchased) was $11.5 million.

In January 2005, the 60% design report was completed. In addition to the power generation construction work previously considered, the scope of this design included four new work elements: 1) MUF building modifications, 2) heating and cooling piping loop modifications, 3) gas compressor replacements and 4) digester gas piping replacements. Although separate from the power generation construction, these additional work elements are necessary to retrofit existing infrastructure to accept the new cogeneration operation. The total project cost was recalculated at $25 million. In June 2005, when the 90% design report was issued, the total cost was $26 million with a reduced contingency. A total project budget of $26 million was then established by the Budget Reconciliation and Capital Systems Team.

When the 100% design report was issued in May 2006, the total project budget was $28 million with contingencies. The WTD then advertised for bids to complete the project under the final engineering design. Although the winning bid for all project elements is $20.4 million, the county determined that the actual project cost would exceed the project budget of $26 million once the WTD's internal costs and other historic costs (i.e., the prepurchased generators and the natural gas pipeline extension) were considered.

In 2007, the WTD retained a third-party consultant to complete a re-analysis of alternatives to use biogas. The contract price to complete the consultant's work was $245,374. The consultant's report was submitted in December 2007 and recommended the use of the prepurchased gas combustion engines. The consultant's capital construction cost was projected as $28.3 million. This total included the purchase of prior equipment and internal WTD labor, but did not include the other related sub-projects (MUF building modifications, heating and cooling loop plumbing modifications, gas compressors and new digester gas piping) previously discussed. Based on current comprehensive estimates obtained from WTD in January 2009, the construction cost estimate for power generation is $17 million and the comprehensive total project cost with a 10% contingency is $39.2 million. A major source of the difference ($6.1 million) is the differential between the contractor's projected WTD internal labor costs for equipment installation ($2.2 million) and the current estimate of $8.3 million.

Condition
Between 2004 and January 2009, total estimated project costs for the West Point waste-to-energy project increased from $11.6 million to $36 million (and $39 million with the current contingency). The WTD actively pursued the project without considering or understanding the degree of uncertainty surrounding the initial estimates. The County did not have policies and procedures consistent with best practices.

Criteria
Guidance provided by the Association for the Advancement of Cost Engineering (AACE) identifies the typical uncertainty range as between +30% to -15% for capital projects.

Cause
The third-party consultant's original estimate failed to accurately predict and communicate future bid results and cost risks. Initial project estimates also failed to reasonably predict the costs of indirect expenses (cost incurred by WTD to implement the project) and additional tasks needed to prepare the site for the equipment.

Recommendations
The tripling costs above the initial estimate are atypical. To improve future estimates, the WTD should require engineering consultants to complete cost estimation analyses in accordance with GAO *Best Practices for Estimating and Managing Program* Costs and complete internal evaluations in accordance with *AACE International Recommended Practice No. 16R-90 Conducting Technical and Economic Evaluations –As Applied for the Process and Utility Industries*. These practices include defined procedures for both sensitivity analyses and risk analyses. The WTD should also consider design-build contracts, which are an industry-leading best practice to eliminate the cost estimate disconnects between the designer and the builder.

Effects of recommendation – potential cost savings and other impacts

The County had to spend an additional $275,374 for a consultant to re-evaluate the original estimated project costs. Project cost overruns deprive the ratepayers the use of these funds to address other ongoing operational needs. In the case of the waste-to-energy project, the WTD is currently anticipating a need to spend an additional $13 million to complete the work, compared to the 2006 approved budget. By withholding funding for capital projects until estimate risks and uncertainties are cases are identified and reduced, potential waste and project delays can be avoided.

King County response

See Appendix I for the County's complete response. The County concurs with our recommendation. The County will consider the use of alternative contracting on future projects where there is appropriate application for the project.

Auditor's Rejoinder

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Issue BG.2: The WTD prepurchased critical equipment totaling $4.8 million prior to developing an accurate budget for the construction of the waste-to-energy project, contrary to best practices.

Background

The planning and implementation of the new cogeneration facility at the West Point Plant has had a long and complex history, which dates back to 2000. At this time, the WTD staff (specifically the Utilities Business Committee within the WTD) determined the optimal approach would be replacing the existing biogas cogeneration system with a more robust infrastructure that could better address the plant's expanded energy needs, which resulted from adding secondary sewerage treatment operations in the late 1990's. In early 2001, the need for internal electrical production was reinforced by widely fluctuating electrical prices from the California energy crisis and below-normal hydroelectric power generation.

Later that same year, the Energy Management Studies Team (a group comprised of both internal and external WTD engineers and consultants) recommended a cogeneration system. The team recommended a design including three 1.4 megawatt (MW) generators, for a total power capability of 4.2 MW. Although insufficient biogas existed for its operation, a fourth 1.4 MW stand-by generator was suggested to provide emergency power if the supply from both feeds from the local utility were disrupted. To operate the fourth generator, natural gas would be needed to serve as supplemental fuel. The design assumed the installation of the generators in an existing multi-use facility (MUF) building.

In 2002, the DNRP advocated a larger 5.2 MW system using two engines and leaving space for a third. This modification was accepted by the WTD's Capital Systems Team (the new name for the Utilities Business Committee), which in early 2003 issued a Notice to Proceed (NTP) to a third party to design the system. As is common practice in complex engineering endeavors, the work was to be completed through the development of 30%, 60%, 90% and 100% design reports. Each of these deliverables refines design parameters and project costs as project data are collected. Other actions and developments in 2003 included a request for a proposal related to the prepurchase of the generators, the discovery that the generators cannot be housed in the MUF building without significant modification due to building code concerns and the determination that the engines' anticipated maximum power yield of 5.2 MW will be 0.6 MW less than originally anticipated. Because of this latter item, the project design was changed to include two 2.3 MW engines.

In March of 2004, the County finalized a $635,700 purchase agreement to extend the gas to help power the cogeneration plant and the 30% design report was submitted by the contractor to the county. The construction cost estimate was $6.1 million. Significant findings included the determination that the system would need to flare a portion of the digester gas to maintain the load consistency required for operation. This dynamic led to the requirement that flares would need to be added to the design to ensure unused biogas is burned in accordance with Clean Air Act regulations. The 30% design report also noted that the vendor could not automatically blend biogas with natural gas, nor could its engines respond favorably to blended fuel. Furthermore, the use of blended fuel voided the vendor's emission guarantees.

Despite the considerations noted above, the WTD executed the purchase of the two 2.3 MW generators one month after the performance constraints were noted. The cost of the engines and associated equipment was $4,791,692. The total project cost estimate (which includes construction, the gas line extension and the engines) was $11.5 million at the time of purchase.

Condition

The WTD purchased two generators costing $4,791,692 prior to obtaining accurate assessment of the full cost to implement the project or comparing the cost to the benefit the system would yield.

The Division identified increases of more than double the original cost estimate for the waste to energy project at the 30% design phase. , In response, they hired a third-party consultant in 2007 to consider other alternatives for the use of the biogas. In addition to the original strategy, the consultant identified seven other alternatives that did not include the use of the purchased generators in their design. However, because the generators were already purchased, the estimated cost of these alternatives needed to be increased to include a portion of the price the County paid for the generators. The new alternative estimates assumed that the Division could recover only 65% of the original purchase price of the generators if the County were to sell them. Hence, these alternative estimates needed to be increased by 35% of the original purchase price of the generator (approximately $970,000) to capture these "sunk" costs. In addition to only being able

to recover 65% of the original purchase price, the Division would be subject to a service contract cancellation fee of $500,000, per the purchase agreement. These costs to pursue other alternatives reduce their cost effectiveness.

Criteria

Decisions to purchase capital equipment should be made only when management has confidently and accurately determined that the future use of the equipment is needed to implement the most cost effective alternative.

Cause

The County based its decision to prepurchase the generators was partially based on a third-party consultant's recommendation. The consultant's recommendation was made to avoid future potential project delays with installation. The WTD staff indicated a secondary concern was that detailed generator design elements and interfaces would not be provided by the manufacturer prior to purchase, however this is contrary to common practice. The WTD, therefore, deemed it prudent to purchase the generators to obtain this information.

Recommendations

WTD's internal procedures should include industry-standard project management practices, such as a critical path project schedule and receipt of certified drawings from manufacturers in advance of purchase. For major new projects, the WTD should first consider the uncertainty of the total project estimate prior to authorization of major capital equipment purchases. Means of evaluating and reporting uncertainty are identified in the recommendations presented in Issue BG.1.

Effects of recommendation - potential cost savings and other impacts

Based on the results of a third-party analysis, the use of gas turbines would prove the most cost effective method of using biogas if the engine generators had not already been purchased. However, because these “sunk” costs needed to be considered, the original gas engine plan is still considered the most cost effective option. At the time generators were being considered, the County had a choice to buy either gas turbine generators or gas combustion generators. Had the County selected the gas turbine generators, they would have saved $540,000, based on the conclusion of the third-party study. By limiting capital expenditures prior to having a better understanding of project cost uncertainties, such errors can be avoided.

King County response

See Appendix I for the County’s complete response. The County concurs with our recommendation. The County has indicated that during the past two years, it has introduced several new practices to better control the pre-purchase of equipment, and some of these practices were implemented following the completion of the audit field work.

Auditor’s Rejoinder

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Issue BG.3: The Wastewater Treatment Division is implementing a new waste-to-energy power generation capital project that will cost $952,000 more per year than a "no action" alternative, contrary to County Ordinance.

Background
A third-party consultant retained by the WTD has determined that the operation of the planned West Point Plant's waste-to-energy cogeneration facility will create a net cost to the WTD. Specifically, the proposed design would require utility rates to achieve a level of $84 to $88 per MWh to break even, whereas the current rate from the local utility is $44.45 per MWh.

Although the King County Executive has the authority to require the pursuit of these goals it is recognized that the WTD service area extends beyond the boundaries of King County and into portions of Snohomish and Pierce Counties. Ratepayers in these areas (that the WTD estimates are approximately 5% of the total number) pay fees to their local cities or sewer utilities for sewer service. In turn, a significant portion of these fees are used to pay the King County WTD for its service.

Condition
The WTD's planned waste-to energy project is not in compliance with King County's Biosolids Policy BP-10. Furthermore, non-King County ratepayers will incur increased costs to address ecological goals adopted by a County Executive who does not serve their jurisdiction.

Criteria
King County established biosolids policies in its Regional Wastewater Services Plan (Ordinance 13680) in 1999. Biosolids Policy number 10 (BP-10) states, "***Where cost-effective**, King County shall beneficially use methane produced at the treatment plants for energy and other purposes*." Accordingly, biogas use must achieve a cost-benefit to be pursued [**emphasis added**]. Third-party engineering analyses indicate that the cost to operate the new waste-to-energy project will be greater than a "no action" alternative. Therefore, it is not cost effective.

Cause
The cost-effectiveness requirement identified under BP-10 was not identified as a requirement in the early project selection, design and implementation evaluations completed by WTD or its consultants.

The project was pursued to meet the King County executive's new energy policy, which entails converting all "reasonably usable" biogas to energy possible. Specifically, the Executive Order PUT 7-6 AEO effective April 1, 2006, states:

"The county will seek to maximize the conversion and use of waste for energy. The Department of Natural Resources and Parks (DNRP) will seek to convert and use all reasonably usable waste at wastewater treatment facilities and the Cedar Hills Landfill to energy. DNRP will also analyze other opportunities to use county or third party wastes to generate energy."

Biosolids policy BP-10 has a cost-effectiveness component and Executive Order PUT 7-6 AEO does not and this creates a potential conflict.

Recommendations
The WTD should pursue projects that are cost effective, consistent with its County Ordinance requirement. Where appropriate, decision making should include representation of those who live outside the King County's jurisdiction and utilize entities such as the Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC), which includes representatives of all rate-paying districts, to capture the consensus of all of the utility's customers.

Effects of recommendation - potential cost savings and other impacts
The additional costs to operate the waste-to-energy project are projected as $952,000 per year and are to be borne by the ratepayers, including those customers who live outside of King County. By identifying a set premium above the current condition that defines the acceptable additional costs for the use of renewable energy, project managers can more readily discern what capital projects would fall within acceptable cost-effective limits for consideration.

King County response

Refer to Appendix I for the County's complete response.

The County concurs with our recommendation. However, the County has indicated that the characterization of the annual waste-to-energy project cost as $952,000 per year is not correct due to revenues associated with renewable energy credits and/or future USEPA grants.

Auditor's Rejoinder

While mentioned as possibilities, the value of the renewable energy credits and EPA grant funding were uncertain during the audit period. The value of these revenue sources is presently unknown. We acknowledge that such revenues, if received, could offset all or a portion of the operational costs depending upon the amount. We also believe a failure to secure such funds could cause a conflict with Biosolids Policy BP-10 as previously cited.

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Issue BG.4: The West Point Water Treatment Plant waste-to-energy project will not have the option of scrubbing and selling a portion of the biogas as a commodity which, as evidenced at the South Plant, can lower the costs of plant operations and reduce the rates charged to ratepayers.

Operations at the South Treatment Plant have the capability of using biogas for power generation or piping it into the local utility where it may be sold as a commodity. The South Treatment Plant earned biogas sale revenues of $1,156,264, $1,004,777 and $1,421,945 in 2005, 2006 and 2007, respectively.

Currently, the West Point Plant uses a portion of its biogas to operate raw sewage pumps and provide heat to the facility. Unused biogas is burned (flared). The WTD currently plans to implement a waste-to-energy treatment project to convert a portion of this biogas to electrical power by installing gas combustion generators.

Condition
The future waste-to-energy design for the West Point Plant will produce electricity from this flared gas, but it will not include the versatility to have the biogas scrubbed and sold to the local utility.

Criteria
WTD ratepayers have the expectation that fees paid represent the most cost-effective means possible to deliver the desired service in a safe and compliant manner.

Cause
Initial assessments by the WTD and a third party engineering firm indicated a potential concern that the design and integrity of the pipeline in the neighborhood near the plant may not be capable of handling the additional pressure created by the injection of biogas into the system. The County asserts the local utility was concerned that the quality of the scrubbed gas may not be suitable for the residential needs of the Magnolia area and that the volume of gas fed to the line could outpace the gas needs of the local area. Lastly, the manufacturer of the original biogas scrubbing equipment used in the South Treatment Plant is no longer in business and the County has not located any other scrubbing equipment vendors.

With respect to the opportunity to scrub and sell the biogas, we noted that the WTD never requested the local utility to define the specific conditions and operational parameters under which biogas diversion to the utility would be allowed. Furthermore, opportunities for a mixed-system alternative (i.e., combining the cogeneration project with diversion) were not evaluated.

Recommendations
It is recognized that site-specific conditions at the West Point Plant Site may limit the potential benefit of diverting *all* biogas to the local utility. However, given the observation that under the current plan that the South Plant will continue to be generating a revenue stream greater than $1.0 million per year and the West Point Plant will likely operate at a loss, as detailed in BG.3, additional review is warranted.

The WTD should ask the local utility provider to define in writing the performance criteria (e.g., gas composition, pressure) under which it would allow gas to be transferred and sold through the utility. Engineering options (including items such as modification of the existing pipeline, laying new pipe, on-site gas storage or compress and truck the gas) could then be explored based on these parameters.

Effects of recommendation - potential cost savings and other impacts
The inability to establish a versatile program that allows the optional use of the biogas as either a salable commodity limits the use of the biogas to power generation and heat recovery systems If only 25% of the biogas could be sold, potential revenues could approach $2,700,000 over a five-year period. This estimate assumes the rate per therm applicable to the South Treatment Plant ($0.7595) would be applicable to the West Point Facility. Although the estimate does not include capital costs to install the gas scrubbing equipment, its expense both from capital and operations perspectives is anticipated to be recovered quickly from future revenue. It is also less costly than that associated with the cogeneration facility.

King County response

Refer to Appendix I for the County's complete response.

The County does not concur with our recommendation. Based on the prior assessments completed by WTD staff, the County believes a flexible system (that allows the sale of gas as a commodity and its use for power generation) would not be a prudent use of resources. Furthermore, The County has indicated that the construction of a gas scrubbing facility at the West Point Plant may violate local height limitations.

Auditor's rejoinder

As discussed in the County's response to the prior (BG-3) finding, efforts have been made to reduce the projected net cost to operate the planned waste-to-energy system by securing renewable energy credits and EPA grant funding. Should these efforts prove successful, the need to pursue a flexible system becomes unnecessary. However, if sufficient revenues are not realized, we affirm our recommendation to re-examine the proposed approach. In pursuit of the flexible system, we acknowledge that variances for equipment installation may be required.

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Biosolids management

Audit area background

Biosolids are the nutrient-rich, organic materials resulting from the treatment of sewage sludge (the name for the solid, semisolid or liquid untreated residue generated during the treatment of domestic sewage in a treatment facility). When treated and processed, sewage sludge becomes biosolids, which can be safely recycled and applied as fertilizer to sustainably improve and maintain productive soils and stimulate plant growth.

To process sewerage sludge into biosolids, solids collected in both primary and secondary treatment are pumped to digester tanks where bacteria break down the biosolids in an oxygen-depleted environment. After treatment, the biosolids are pulled from the digesters and dewatered with either centrifuges or filter presses. Then they can be applied to forest areas or cropland as a soil treatment. Although local communities often fought application of biosolids to croplands and forested areas, improvements in processing, regulatory controls, community outreach and educational efforts in the past decade have increased public acceptance. In arid areas east of the Cascade Range, biosolids are commonly valued as a nitrogen fertilizer and because they retain moisture.

Biosolids are strictly governed through both federal and state-based regulations that require entities generating or applying biosolids to land to acquire permits. In the state of Washington, these permits are managed by the Department of Ecology.

Washington Administrative Code (WAC) biosolids regulations establish two classes (A or B) of biosolids, which are differentiated based on pathogen levels. Under the code, Class A biosolids have lower fecal coliform levels and are authorized for a broader range of use. Class B biosolids must meet less stringent fecal coliform requirements but are also subject to more restrictive control. In general, Class A biosolids may be used in areas where public access does not need to be restricted (e.g., home gardens) and Class B biosolids may be applied to land whose use or access by individuals is controlled or restricted for a required period, no less than 30 days.

Currently, the WTD processes all its biosolids to a Class B level16 and combined annual production is approximately 110,000 wet tons. In 2005, the county retained an outside consultant (Brown and Caldwell) to examine the feasibility and costs associated with processing the biosolids to a Class A level. The study was initiated because of a concern that local community opposition near biosolids application areas may impair the WTD's ability deposit biosolids on agricultural fields as a soil amendment. The results of that effort are included in the Class A Biosolids Integrated Implementation Work Plan. Since the completion of the study, no action has been taken. Further efforts to implement a Class A program have been tabled because of concerns about the high capital costs of the program's implementation and uncertainty about the market price that could achieved for Class A biosolids in the Seattle area.

[16] A small portion (3%) of the total volume is processed to a Class A level by other parties.

For the past three years, the Class B biosolids have been shipped to one of four types of biosolids management facilities. These locations are illustrated in the Figure WTD-1 below. In exchange for the use of the biosolids material, farming or state landowners pay a minimal fee to the WTD. Further details on each of the application sites are presented in the bulleted information below the figure.

Figure WTD.1 Biosolids Application Sites. Source: King County Wastewater Treatment Division

- **Dryland Wheat Farming (Boulder Park, Inc.)** – The largest share of biosolids is shipped to a dryland wheat farming area in Douglas County managed by Boulder Park, Inc. Shipments have been made to the Boulder Park area since 1991. Between 2006 and 2008, this location received between 44% and 67% of the total annual volume of biosolids. The Boulder Park location benefits from being able to store the biosolids at times when direct application is not possible prior to the harvest season. It also has ample storage capacity that does not limit the volume it can receive. Disadvantages for this location include its greater distance (and increased transportation costs) from the treatment plants, and its potential to become inaccessible when mountain routes through the Cascades are closed in poor weather. The Boulder Park site receives biosolids from multiple municipalities and utility districts. The application of these biosolids therefore needs to be carefully coordinated to ensure the same fields are not receiving multiple applications within an unacceptable time frame. Since Boulder Park, Inc. does not have its own beneficial use permit, it relies on the WTD's biosolids application and management team to maintain compliance with permit requirements. The Boulder Park site has a 100,000 wet ton capacity.
- **Natural Selection Farms, Inc. (Green Valley Agriculture)** – Natural Selection Farms, Inc. is a local land application company and was formed by local farmers. In 1991, the farm began working with King County to recycle biosolids. Since then, Natural Selection Farms, Inc. expanded the project to include biosolids from other cities, such as Sunnyside and Yakima, and began composting biosolids and other farm residuals. In contrast to Boulder Park, Inc., Natural Selection Farms, Inc. has its own beneficial use permit. Since 2006, this site has received between 6% and 24% of the total annual distribution. The Green Valley Agriculture site has a 75,000 wet ton capacity.
- **Forestry application sites – Eastern King County** – Forestry application sites in King County include tree farms in the Snoqualmie National Forest and the Mountains to Sound Greenway along Interstate 90. The tree farms are managed in cooperation with Weyerhaeuser Corporation. The advantages of the forest application include its nearby location and potential year round access. However, the capacity of permitted locations is limited to approximately 40,000 wet tons. The forest landscape also requires more

consideration to slope and drainage considerations. Since 2006, forestry application sites have received between 24% and 29% of the total distribution.

- **GroCo Biosolids Compost** – This is a Class A biosolids product produced by an independent company (Sawdust Supply) based in Seattle. Sawdust Supply mixes the biosolids with sawdust to achieve a Class A, marketable product. Although the company only receives a small percentage of the total volume (approximately 3% each year), it serves as an important secondary distribution site when access to the larger application sites east of the Cascade Range is unavailable. Disadvantages to its use include higher costs on a per ton basis.

Biosolids recycling summaries prepared by the Biosolids Program Team (BPT) indicate the cost of biosolids management was $5.4 and $6.3 million per year in 2006 and 2007, respectfully. The largest annual expense is for the biosolids program is transportation to the application sites. This cost has varied from $2.4 million to $3.1 million in the same period.

During the Phase I review, Ernst & Young noted that demand for biosolids (especially for areas east of the Cascades) exceeds the county's supply. Furthermore, the county has no biosolids internal storage capacity and shipping biosolids was exclusively performed by a contracted trucking service. Therefore, Ernst & Young indentified biosolids handling as a focus area because the pricing or storage/transportation of the biosolids may present opportunities for additional income or lower operational expenses.

Issues and recommendations – biosolids management

Issue BI.1: The biosolids program lacks a long-term strategic plan that defines the specific goals related to the sales of biosolids which can reduce the rates charged to ratepayers.

Background
Until 40 years ago, sewers discharged raw or partially treated sewage directly into Lake Washington and Puget Sound. In King County and elsewhere, improvements to wastewater treatment facilities helped reduce pollution to waterways. But solids were still considered a waste and were typically dumped in landfills or discharged into the ocean.

Historically, the Biosolids Program Team (BPT) has not actively solicited potential customers of biosolids materials. Those sites that make up the current portfolio have been carefully considered, nurtured and screened over time to avoid potential concerns or a sudden denial of site access due to local opposition. This risk is significant because the WTD lacks the internal storage capacity to house biosolids on its own property. To further limit the WTD exposure to this threat, the King County Council adopted a biosolids policy mandating that the WTD maintain minimum customer outlets of 150% of the annual planned production.

Recently, the BPT started seeking new markets for the material. In October of 2008, the BPT received 11 responses to its initial Request for Information (RFI) from parties seeking access to the biosolids for beneficial use. Parties responding included current application sites and other firms discussing new conceptual strategies for the biosolids as fuel or mine reclamation material. No decisions have been made regarding the screening or continued consideration of the proposed strategies.

Condition
The Regional Wastewater Services Plan for the WTD contains aspects of a strategic plan (such as future, large-scale planned capital improvement projects), but long-term goals and plans for programs within the WTD (such as the biosolids program) are not identified. The lack of a plan with defined goals creates uncertainty about how various considerations, such as future revenue, biosolids application site access and program flexibility, will be pursued.

Criteria
A best practice followed by a sister Division to the Wastewater Treatment Division (King County Water and Land Division) is the development and management of a strategic plan in that they issued 2001. Common practice is for strategic plans to establish internal goals that are specific, measurable, attainable, relevant and time-bound.

Cause
The regulation of biosolids has been evolving at a fast pace over the past decade. Furthermore, community responses and reactions to biosolids use can be volatile and subject to significant and sudden change. This instability has caused a resistance to create longer-term plans.

Recommendations
The WTD should pursue a long-term strategy for defining criteria for screening, selecting and managing a pool of vendors under a competitive bid process. All of these actions should be conducted at planned intervals. Additional goals include expanding the market interest of the biosolids product to increase the price end-users are willing to pay. Goals established as part of the strategic plan should adhere to leading industry practices to ensure they are specific, measurable, attainable, relevant and time-bound.

Effects of recommendation - potential cost savings and other impacts
A strategic plan allows management to best direct capital and human resources to achieve agreed-upon goals. It also has the ability to serve as a valuable tool for gauging the performance of the program. Improvements in the efficiency of contractor selection and increased revenue from biosolids sales lower the operational costs funded by WTD ratepayers.

King County response

Refer to Appendix I for the County's complete response.

The County concurs with our recommendation and has indicated that it is proceeding to develop a Biosolids Strategic Plan. This plan will include goals and objectives whose form adheres to best industry practices and will translate to specific performance measures in annual business plans. The estimated completion date for the plan is the second quarter of 2011.

Auditor's Rejoinder

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit

Issue BI.2: Management has not established adequate coding and classification of time and revenues for application sites to allow their selection based on which is most cost effective.

Background
The WTD uses the Integrated Business Application System (IBIS) to manage financial information. This database allows costs to be coded by project area and cost center. For example, Project Code 421299 represents Biosolids Planning and Policy Development. Cost centers used under this project code for the period from 2005 to 2008 include those illustrated below:

- 4110-Wtd Director Office-Salary/Wages/Employee Benefits
- 4620-Tech-Resource Recovery-Intragovernmental Service
- 4620-Tech-Resource Recovery-Salary/Wages/Employee Benefits
- 4620-Tech-Resource Recovery-Services/Other Charges
- 4620-Tech-Resource Recovery-Supplies

For the years from 2006 and 2007, Ernst & Young compared the total program costs in the IBIS to those identified in the 2006 and 2007 Biosolids Recycling Summaries. For these two years, Ernst & Young noted that the IBIS identified costs of the biosolids program as $5.2 and $6.2 million, respectively. Net costs for 2006 are $5 million and for 2007 are $6 million. Values stated in the annual summaries are $5.4 million and $6.3 million. . Furthermore, it was noted that revenue from Forestry (DNR) application sites was only identified in 2006, although the summaries reported application to forestry sites in both years. BPT staff were unable to determine why there were differences, but suspect they are attributable to year by year "timing differences" from when revenues and expenditures are booked.

A further observation is that the largest single cost center for the program is 4620 (Tech-Resource Recovery-Services/Other Charges), which is housed within Project Code 421301 (Distribution and Hauling Management project). This cost represents the fees paid to the WTD's contractor for the transportation of biosolids to the application sites. Annually, the transportation expenses reflect approximately 50% of the program cost. Because this information is captured as a total amount and not segregated based on specific land application sites, its use in determining expenses related to a given application site is limited.

Condition
Current IBIS data organization limits the ability to determine an accurate dollar-per-ton cost associated with shipping and use of the various application sites. Annual revenue from biosolids sales to the various application sites is also difficult to identify in IBIS data.

Criteria
The coding of time, costs and revenue should be clear and consistent to allow program efficiencies to be evaluated.

Cause
Guidance and review procedures have not been established to adequately define and manage the coding of work or subcontractor costs in the biosolids program.

Recommendations
The WTD should establish internal guidance on the coding and collecting of time, expenses and revenue within the biosolids program. The guidance should also include monthly review procedures to identify errors and opportunities for improvements. Revenue from the sales of biosolids, transportation costs and other managerial costs should be directly assigned to a cost center code that defines an application site, whenever possible. In cases where the work is related to the general management of the program, the costs should be collected in a manner allowing these expenses to be prorated among the facilities, based on the percentage of biosolids delivered to them.

Effects of recommendation – potential cost savings and other impacts
By improving the detail of the data captured in the accounting system, reports can be created that show management the cost of biosolids application. Management can use that information to select those application sites that have the lowest cost, thereby reducing the cost and the rates charged to ratepayers.

King County response

Refer to Appendix I for the County's complete response.

The County concurs with our recommendation. WTD agrees that it is useful to calculate cost per ton per distribution site periodically, and will perform this calculation at least once a year, or as beneficial to decision-making for the program.

Auditor's rejoinder

We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit

Issue BI.3: Biosolids Program Team has not sought compensation from other municipalities or utility districts for reporting assistance related to their biosolids material.

Background
The management of biosolids within the state of Washington is jointly governed by federal law (40 CFR Parts 503, 501 and 122) and state statutes (70.95J RCW, chapter 173-308 WAC "Biosolids Management," and chapter 173-350 WAC "Solid Waste Handling Standards"). Management of the permitting process outlined in the code is done by the Department of Ecology.

In 2005, the Department of Ecology issued the General Permit for Biosolids Management, which serves as the vehicle for implementing WAC biosolids regulations. Treatment Works Treating Domestic Sewage (TWTDS) and beneficial-use facilities apply for coverage under the general use permit. TWTDs subject to the general permit in King County include the South, West Point, Vashon Island and Carnation Water Treatment Plants. Carnation and Vashon Island require permits, although all their biosolids are transferred to the South Water Treatment Plant for additional processing. In August 2007, the Department of Ecology notified King County that its biosolids program was granted final approval of coverage under the Statewide General Permit for Biosolids Management. To maintain permit compliance, the biosolids program must complete several ongoing actions. These include:

- Sampling and analyzing to ensure the biosolid materials meet the Class B quality requirements related to pathogen levels and trace metals.
- Developing site-specific biosolids application plans for Department of Ecology review.
- Ensuring that application sites are in compliance with regulatory restrictions regarding setback from property boundaries and waterways, slope stability and access control.
- Providing advance notice to permitting authorities and the public.
- Post application sampling and monitoring.

Beneficial-use facilities are land application sites that have applied for separate coverage under the permit. An example is a private contractor that assumes full responsibility for managing a land application project. Beneficial-use facilities assume the site planning and management obligations that would otherwise remain with the biosolids generators. However, a land application site does not have to be a beneficial-use facility. In this case, the biosolids generator is responsible for meeting regulatory requirements. In contrast, when a generator provides biosolids to a permitted beneficial-use facility, it is not required to submit land application plans if the biosolids meet the facility's quality requirements and the facility meets the criteria defined in the generator's original application.

Condition
At sites where the WTD's biosolids are applied, ongoing monitoring and management actions are needed. Although these actions are typically performed by WTD staff or a consultant retained by WTD, they may benefit other municipalities and utilities that are also using the application area. For example, during the review it was noted that WTD staff produces an annual report for the Boulder Park facility that summarizes sample data and work performed over the past year. This benefits Boulder Park's other biosolids providers.

Because a portion of the biosolids accepted at Boulder Park's operation are not related to King County, other cities and utility districts benefit from the work performed. However, a program does not exist to prorate the costs of the service to the various cities and sewer utilities based on the volume of biosolids sent to Boulder Park.

Criteria
Costs for a service should be assigned to the party receiving the benefit on an agreed and proportional basis.

Cause
Improper operations or inadequate compliance efforts can jeopardize use of the facility and lead to penalties against the permit holder. Fears related to these concerns have caused the biosolids program team to maintain a high level of involvement. Historically, the WTD has

spearheaded these efforts because it has the most experienced and knowledgeable staff to address these risks. It has not sought any external compensation for these efforts from other municipalities or utilities.

Recommendations

The BPT should identify those activities that serve a general benefit to all users of an application site and place these expenses and time under separate project codes. Where possible and cost beneficial, the team should seek agreements with other users of these facilities to share these expenses on an agreed and prorated basis, such as the volume of biosolids applied in the past year.

Effects of recommendation - potential cost savings and other impacts

For the Boulder Park Annual Report cited above, WTD staff time is estimated at 60 hours per year and the WTD accounts for approximately 3/4 of all the wet tons applied in 2007. Staff time and expenses to address this or other aspects of the Boulder Park work that have a general benefit cannot be discerned based on the manner in which the data are currently collected and coded. Given these limitations, an accurate estimate of the potential savings derived from the pursuit of cost-sharing arrangements cannot be discerned.

King County response

Refer to Appendix I for the County's complete response.

The County concurs with our recommendation and has indicated that in the future, WTD staff will identify significant expenses appropriate for cost-sharing, and evaluate practical and equitable means for prorating costs to other users of application sites. The County also wishes to make clear that while it may assist other utilities it does not manage or have responsibility for biosolids from any other utility water treatment utility.

Auditor's Rejoinder

We concur and support the clarification presented. We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit

Issue BI.4: Management can increase the amount they charge for biosolids material which can reduce the rates charged to ratepayers.

Background
In exchange for the use of biosolids material, farming or state landowners pay a fee to the WTD for its use. Currently, the rate paid by the largest user of biosolids (Boulder Park) is $6.40 per dry ton. This equates to 13.7 cents per pound of nitrogen, based on biosolids nitrogen content. Green Valley Agriculture pays 18 cents per pound of nitrogen.

The use of biosolids has both advantages and disadvantages compared to commercial fertilizer. For example, biosolids enhance moisture retention which is a sought-after benefit in the drier, wheat growing areas of central Washington. Biosolids also have small amounts of phosphorus and potassium that are also active fertilizer ingredients. The cheapest forms of commercial fertilizer (anhydrous ammonia) do not have these elements. Finally, as opposed to anhydrous ammonia, Class B biosolids do not need to be stored under pressure nor do they present a risk of chemical burns in the event of an equipment failure. Biosolids also have an advantage because they are not subject to potential theft due to a desire to illegally manufacture methamphetamine.

The disadvantages associated with biosolids include: (1) Undesired soil compaction due to multiple passes that are often required when applying biosolids with a manure spreader (as opposed to one pass typically required by commercial fertilizer), (2) extra "hassle factors" associated with biosolids recordkeeping, uncertainty of supply, and regulated wait periods between planting and harvest (3) a social stigma associated with their use, especially near residential areas.

As previously mentioned regarding Issue BI.1, the BPT has not historically solicited and expanded the base of potential biosolids customers. Recently it sent a RFI to determine interest from additional parties. Factors it will use as a basis for evaluation include:

- Reliability
- Year-round availability and access
- Flexibility in tonnage received on a daily and weekly basis
- Competitive cost
- Local sponsor or spokesperson
- Community support and local agency support
- Storage capacity to handle peak deliveries
- Low risk
- Additional program diversity
- Demonstrable and multiple benefits
- Emphasis on quality control
- Social justice/equity
- Innovation
- Carbon reduction and advancement of the county's greenhouse gas emission control goals.

Condition
For the biosolids product, the WTD charges customers between 13 and 18 cents per pound of nitrogen delivered. Commercial fertilizer rates are greater than 36 cents per pound. Purchasers of WTD biosolids are therefore able to acquire nitrogen for less than 50% of the cost of common commercial fertilizers.

Criteria
The WTD should seek to acquire the maximum return the market will bear for the sale of the biosolids.

Cause

In the past, a stigma was attached to using biosolids. But today, general market acceptance and improved regulatory controls are removing this hurdle. Furthermore, the pool of biosolids users has been relatively small and controlled to ensure vendor handling and performance requirements were being met. The small pool of users limits the ability to move toward a value-based price for the product.

Recommendations

The WTD should try to improve its marketing of the material and expand the sales base, allowing for an increased sales price. This, in turn, would lower the cost of the biosolids program to the benefit of the ratepayers.

Effects of recommendation – potential cost savings and other impacts

Due to concerns about local area acceptance and additional handling and regulatory requirements, biosolids are not expected to achieve a market price (based on nitrogen content) equal to commercial fertilizer. However, improved marketing and expanding the sales base should provide a higher sales price over time. This, in turn, would lower the cost of the biosolids program to the benefit of the ratepayers.

Currently, the price achieved by the BPT is roughly half that of commercial fertilizer. If the gap was closed to allow the price to rise to 75% of the market price, by enlarging the pool of approved facilities or opening a portion of the supply to a competitive bid process, the additional revenue created would approach $1,000,000 over a five-year period.

We view the 75% value as a reasonable goal to be sought as part of a future strategic plan. However, it is recognized that revenue alone should not be the sole determinant for the selection of land application sites due to other potential cost considerations. For example, land application sites further from the treatment plants may incur higher transportation costs that more than offset any benefit from additional revenue. These considerations can be more easily assessed once IBIS data organization is improved as discussed in the recommendations outlined in Issue BI-2.

King County response

Refer to Appendix I for the County's complete response.

The County concurs with our recommendation. The WTD is preparing to enter negotiations for its biosolids land application contracts and will have opportunities to reexamine the appropriate market value for its product. However, the County has also indicated that the current demand for the biosolids exceeds supply and therefore increased marketing may be counter-productive

Auditor's Rejoinder

We acknowledge marketing efforts may be unnecessary if higher revenues may be achieved based on the current level of demand from prudent distribution sites. We thank the County for its response and for the cooperation and assistance obtained from its staff during the audit.

Information technology

Audit area background

The Wastewater Treatment Division (WTD), the Solid Waste Division (SWD), and King County cost allocations rely on IT systems for daily operations and support of the business processes. According to GAGAS Section 7.24, "When information systems controls are determined to be significant to the audit objectives, auditors should then evaluate the design and operating effectiveness of such controls." We used a combination of audit steps to identify the issues and conclusions included in this report. Those steps included review of data generated by IT systems, which we mainly used to calculate potential cost savings. In addition, the data also assisted in developing the issues in some instances – because of this we chose to review the general controls of those specific IT systems. In other words, IT controls should be assessed based on the overall reliance of IT systems in the audit report and the foundational role they play in business processes. As such, we limited the initial scope of the audit procedures to a review of only the IT systems that directly support the issues noted in this performance audit report. Our initial focus included the following IT applications:

Application Name	Description
MSA	This application is the primary payroll application for the SWD. The application is housed in a mainframe environment.
Journyx	This application is the primary application used by the SWD for tracking employee time.
CCG Faster	This application is a Fleet Management application used for tracking and processing asset, parts, work order repairs and fuel management.
PeopleSoft	This application is used by the King County Human Resources department and payroll operations. This application is integrated with the MSA application.
ARMS	This application is the general ledger application for the SWD. The application is housed in a mainframe environment.
IBIS	This application is the general ledger application used by the WTD

We grouped the IT General Controls (ITGC) reviewed and evaluated for this audit into three main categories. Similarly, audit issues we identified are grouped into the same categories.

Categories:
Change Management: This represents the controls surrounding the process of how changes to computer systems used by management are initiated by end users of the system. Specifically, Ernst & Young evaluated the controls associated with authorizing, testing and approving changes prior to implementation. Additionally, we evaluated the individuals performing the controls to change management to identify conflicting duties. The scope of review was limited to changes made at the application layer.

Logical Access: This represents the controls that govern access to the data and IT systems for authorized personnel. Specifically, Ernst & Young evaluated the controls for adding, modifying, deleting and restricting access to the IT systems.

IT Operations: This represents the controls related to back-up and recovery processes in the event of a system outage or similar event that may affect data integrity. IT operations also include access to the data centers and environmental controls. These were also evaluated as part of the review.

Issues and Recommendations – Information Technology

Audit Issue IT.1: Information Technology system change controls do not meet industry standards

Background
As part of the evaluation of the controls around the change management process, Ernst & Young interviewed the application owners to gain an understanding of the controls around system changes.

Per standard industry practice, system changes are typically authorized by the business users, developed by the developer in an environment completely separated from production (live) system, tested and confirmed by the user and approved by the system owner before changes are moved to production environment. To prevent developers from making unauthorized changes to the system, developers are organizationally and logically restricted from accessing the production environment.

We noted separate Change Management processes for each of the IT systems relevant to the audit. We found recurring issues relating to segregation of duties, monitoring of the production environment and retention of audit trail.

We reviewed the users within the systems to identify the individuals with access to make significant changes to the application and the individuals who have the access to move those changes to the production environments. In general, we noted a lack of logical separation of duties.

The risks associated with the lack of segregation of duties are typically mitigated with monitoring of the production environment. However, we noted no controls around monitoring of the production environment.

The retention of audit trail is important to evidence that personnel follow pre-established business processes that mitigate or limit other control risks. Specifically related to Change Management, an audit trail is important to identify who made changes within a system and if those changes follow appropriate approvals prior to being implemented. We noted a lack of documentation to show that the change management controls are operating as stated.

Condition
The duties of individuals that have the technical knowledge to make significant changes to the IT systems are not logically separated from the individual that can move these changes to the production environment (PeopleSoft). In addition, the production environment is not monitored to detect unauthorized changes moved to the production environment (PeopleSoft). Therefore, the risk exists that an unauthorized or improper change can be made to the system that would go undetected. Furthermore, documentation relevant to the change management process is not retained consistently.

Criteria

Control Objectives for Information and related Technology (COBIT 4.1) indicates the production environment should be separated from the development and test environments and access restricted to select individuals outside of the team of developers to minimize the risk of unauthorized or improper changes developed and moved to production. If all changes to production environment are reviewed the risk of unauthorized changes can be mitigated. An approved policies and procedures documentation around change management should be applied consistently and evidence to show proper approval and testing of system changes should be retained.

Cause
Management has not established adequate segregation of duties in their change management process. Management believes that developers require access to production as a backup for unforeseen system events/incidents that could potentially disrupt the availability of the IT systems and to troubleshoot any issues reported by the users. In addition, there are no approved policies around segregation of duties, production monitoring and retention of audit documentation.

Recommendations
SWD and WTD should develop policies and procedures around the change management process to incorporate industry best practices. Specifically, the creation and enforcement of segregation of duties (SOD) matrixes and review policies to enforce responsibilities within the

change management process that should be separated logically and organizationally to prevent individuals from performing conflicting duties. Also, documentation related to the change management should be retained for a specified period.

Effects of recommendation - potential cost savings and/or other impacts

The control deficiencies could adversely influence the information contained within the system, affecting management decisions based upon incorrect data. Additionally, they could affect the accuracy of the potential calculations included in the issues identified in this report. Specifically, the potential calculations may be affected if the described control deficiencies allowed undetected changes to the data contained within the applicable IT systems. The stated impacts are for informational purposes only and are subject to the control deficiencies identified here. It is also noted that it was not possible to validate the system data accuracy without extensive audit effort which goes beyond the scope of our purposes.

King County response

King County concurs with the recommendation. Refer to Appendix I for the County's complete response.

Issue IT.2: Information Technology access controls do not meet industry standards.

Background
Ernst & Young evaluated the controls around adding, modifying, deleting and restricting access to the IT systems by performing walkthroughs with the system owners to gain an understanding of the logical access controls.

The objective of an access control review is to determine that only authorized persons have access to data and applications (including programs, tables, and related resources) and that they can perform only specifically authorized functions (e.g., inquire, execute, update). We need to consider whether IT logical access provides sufficient evidence regarding the appropriate restriction or segregation of incompatible, relevant functions to rely on system data.

There are separate logical access processes for each application in scope for the audit. Ernst & Young noted recurring issues around removal of access from the applications and periodic review of users /access rights. Also noted were issues related to a lack of segregation of duties amongst business users, shared administrator accounts/passwords and retention of audit trail.

Although there are controls and processes in place around removal of access rights, we noted gaps in the process primarily associated with the timely notification from HR. Upon the termination or retirement of an employee with access to the application, there is no centralized process to notify the application administrators to remove access from the systems. As such, the risk exists that a terminated employee would retain access to the applications.

The risk associated with terminated employees retaining access to the applications is typically mitigated by a periodic review of user access rights. However, we noted that users /access rights to the applications are reviewed infrequently or not reviewed at all.

We reviewed the users within a specific application and noted multiple business users with access to make changes to sensitive application configuration settings. Per standard industry practice, the ability to make changes to sensitive application controls should be limited to select individuals; changes to these settings must be approved and monitored regularly.

An instance of a shared administrator account was noted during our walkthrough meeting. Due to the sensitive access rights inherent to an administrator account, sharing this account reduces the likelihood of detection if an unauthorized change is made to the system.

The retention of an audit trail is important to evidence that personnel follow pre-established business processes that mitigate or limit other control risks. Specifically related to logical access, an audit trail is important to evidence that the design and operation of the controls is appropriate.

Condition
Application level accesses for terminated or retired employees are not removed in a timely manner. There is no centralized process in place to identify whether IT is notified when an employee is terminated. User access reviews, to confirm appropriateness of user access, are either performed infrequently or not performed at all. We noted for a specific application, that the system administrator id and password is shared by the IT team. Furthermore, documentation relevant to the logical access process is not retained consistently.

Criteria

Control Objectives for Information and related Technology (COBIT 4.1) indicates the business users' access should be separated to ensure that no one user can authorize a transaction, gain custody of asset, record transaction and perform a control activity. Approved policies and procedures documentation for granting and removing access should be applied consistently and evidence of review retained for a defined period. The quarterly review of users should identify inappropriate access to the system. Inappropriate access indentified during this review should be evaluated to determine the extent of any damage and removed. Evidence of the review should be documented and retained for audit purposes. Each administrator should have separate accounts to ensure accountability can be established and maintained.

Cause
Management does not have defined or enforced policies around timely notification of IT upon termination of an employee, periodic review of user access rights, shared accounts or document retention. A segregation of duties check is not incorporated in the access provisioning process for some of the applications. Also, Management does not have a defined Segregation of Duties Matrix to help prevent granting

excessive access to the application. The decentralized structure of HR (HR central, department and division) facilitates the inconsistencies noted in the process of notification of terminated employees. Also, there is no audit trail related to removal of access for terminated employees. Finally, there is no organizational standard prohibiting the use of shared accounts. The above stated causes are area that fall outside of common industry practice.

Recommendations

SWD and WTD should review the policies and procedures around the logical access process to incorporate industry best practices specifically related to termination of users, review of user rights and documentation retention. In addition, we recommend that management review all users and responsibilities and identify conflicting roles and excessive access. In addition, management should create a Segregation of Duties Matrix by which access change request would be evaluated for potential conflict of duties.

Effects of recommendation – potential cost savings and/or other impacts

Failure to discontinue and remove access permissions in a timely manner for employees who are no longer employed by the County could lead to unauthorized and inappropriate access to the system information and impair functionality and integrity of the information within the system. The control deficiencies could affect the accuracy of the potential cost savings calculations included in the issues identified in this report. Specifically, potential cost savings calculations may be affected if the described control deficiencies allowed undetected changes to the data contained within the applicable IT systems. The stated potential cost savings are for informational purposes only and are subject to the control deficiencies identified here.

King County response

King County concurs with the recommendation. Refer to Appendix I for the County's complete response.

Issue IT.3: Access to data centers and environment controls in the data centers do not meet industry standards.

Background
The servers that house the IT applications for WTD and SWD reside in two local data center facilities managed by county employees.

Ernst & Young visited the two local data center facilities to evaluate the physical access and environmental controls around the data centers using industry standards such as COBIT 4.1 and the International Organization for Standardization (ISO) 27002. We noted issues related to the number of employees with badge access to the data centers and environmental controls inconsistent with industry standards.

We obtained the badge access report for one of the data centers and noted that an unusually large number of employees have access to the data center facilities.

We also noted gaps in environmental controls around the data centers. Specifically, we identified issues related to the fire suppression systems, temperature and climate control, backup power supply and generators.

Condition
Access to the data center is not restricted to County employees that require access to perform their job functions. The environmental controls around the data center are inconsistent with industry standards. Also, the process for granting and removing data center badge access is not consistently applied and the data center access list is not reviewed on a periodic basis.

Criteria

Control Objectives for Information and related Technology (COBIT 4.1) indicates the data centers should have environmental controls consistent with industry standards and access to the data centers should be restricted to select employees

Cause
Data centers operated by WTD and SWD have not kept up in pace with the evolving industry standards, nor have their policies and procedures.

Recommendations
The creation of a Global Standard Operating Procedure (SOP) should be established at a high level to define the minimum standards for all data processing facilities. Individual data center SOP's may also be of use in defining individual facility rules and expectations.

The Global policy should define individuals' roles and responsibilities within a data center, define data center environment standards and update facilities according to guidance such as COBIT 4.1 and the ISO 27002 framework. It should also be mandated that access be to the facility is provisioned, de-provisioned and reviewed on a regular basis.

Effects of recommendation - potential cost savings and other impacts
Improper controls surrounding operation of and access to the data center could result in the loss of data or in extensive downtime should an event occur because of lack of controls. The control deficiencies could affect the accuracy of the potential cost savings calculations included in the issues identified in this report. Specifically, the potential cost savings calculations may be affected if the described control deficiencies allowed undetected changes to the data contained within the applicable IT systems. The stated potential cost savings are for informational purposes only and are subject to the control deficiencies identified here.

King County response
King County concurs with the recommendation. Refer to Appendix I for the County's complete response.

Appendix A

Initiative-900 Elements

Appendix A provides a chart showing each I-900 element and where each is addressed in the performance audit issue areas.

I-900 Element		Biosolid Management	Central Service Overhead Charge	Approving overtime	Methane Resale	Reducing Discharge Fees	Fleet and Maintenance Management
1	Identification of cost savings	**X**	**X**	**X**	**X**	**X**	**X**
2	Identification of services that can be reduced or eliminated		**X**	**X**			**X**
3	Identification of programs or services that can be transferred to the private sector						
4	Analysis of gaps or overlaps in programs or services and recommendations to correct gaps or overlaps		**X**				**X**
5	Feasibility of pooling information technology systems within the department						**X**
6	Analysis of the roles and functions of the department, and recommendations to change or eliminate departmental roles or functions						**X**
7	Recommendations for statutory or regulatory changes that may be necessary for the department to properly carry out its functions		**X**	**X**		**X**	**X**
8	Analysis of departmental performance data, performance measures, and self-assessment systems		**X**	**X**			**X**
9	Identification of best practices	**X**		**X**	**X**	**X**	**X**

Audit Objectives

1	Operational Efficiency	**X**		**X**	**X**	**X**	**X**
2	Limiting Administrative Costs	**X**					**X**
3	Limiting Overhead Allocations		**X**			**X**	

Appendix B

Summary of leading practices by Solid Waste and Wastewater Treatment Divisions (Unaudited)

Appendix B provides a chart showing the leading practices of the audit identified throughout the report and which management areas or operations the leading practices were identified in.

LEADING PRACTICE		King County
Performance Monitoring	King County provides the public detailed performance reporting for all operational divisions through its Kingstat system created with community feedback.	X
Overhead Rebates	The Finance and Business Operations (FBO) Division within King County is an Internal Service Fund that charges other King County agencies for their finance and treasury services. In 2005, 2006, and 2007 FBO calculated a rebate for organizations that receive its allocations. *NOTE: Our issue makes recommendations on how the County can improve the calculation of those rebates to more closely reflect actual expenses instead of budgeted expenses.*	X

LEADING PRACTICE		Solid Waste Division
Landfill Operations	The Solids Waste Division demonstrates a leading practice by collecting landfill gas, removing impurities and selling it as a commodity to the local utility.	X
Landfill Operations	The Solids Waste Division optimizes airspace utilization by placing future capping soils atop landfill cells that are temporarily closed, thereby using the weight of the material to compress the waste.	X
Landfill Operations	The Solids Waste Division optimizes airspace utilization by using temporary fabric liners to cover the working face of the landfill. This process avoids the use of soil as a daily cover which would reduce the airspace available for waste.	X
Landfill Operations	The Solids Waste Division optimizes airspace utilization by removing and reusing the rock used to create the roadways trucks use to transport the waste to the working face.	X
Landfill Operations	The Solid Waste Division uses blasting cap pistols to deter birds and limit nuisance issues.	X
Landfill Operations	The Solid Waste Division places piping in the waste section as the landfill is being constructed. This strategy avoids the additional cost of future excavation and placement at a later date.	X
Landfill Operations	The Solid Waste Division installs piping systems with flexible connections which reduces the potential for future breakage as settlement takes place.	X

LEADING PRACTICE		Wastewater Treatment Division	
		South (Renton) Treatment Plant	West Point Treatment Plant
Treatment Plant Operations	Both treatment plants use have heat recovery systems that use a portion of the digester gas to operation pumps or turbines. Heat recovered from these systems is then used to heat the digesters.	X	X
Treatment Plant Operations	The South Treatment Plant recovers unused digester gas (biogas) removes impurities and sells it as a commodity to the local utility	X	
Treatment Plant Operations	Both treatment plants use reclaimed water in internal operations. At the South Plant, reclaimed water is also used for irrigation at a nearby sports field and wetland nursery.	X	X
Treatment Plant Operations	Both treatment plants operate an environmental management system to guide compliance, process, and continuing improvements.	X	X
Treatment Plant Operations	The Wastewater Treatment Division's operations include ongoing efforts to reduce inflow of storm water and infiltration.	X	X
Treatment Plant Operations	The Wastewater Treatment Division's provides real-time public disclosure of combined sewer overflow sites via a web based application.	X	X
Treatment Plant Operations	The South and West Point Water Treatment Plants have achieved 100% compliance with National Pollution Discharge Elimination System (NPDES) reporting during the past three years.	X	X

LEADING PRACTICE		Wastewater Treatment Division
		Biosolids Management
Biosolids Management	The Biosolids Management Program has a robust public relations program to nurture public acceptance and community support at its application sites.	**X**
Biosolids Management	The Biosolids Management Program has completed certification of its Environmental Management Program by an accredited third party.	**X**
Biosolids Management	The Biosolids Management Program conducts independent oversight of application sites where King County biosolids are applied.	**X**

LEADING PRACTICE		Fleet Division	
		Solid Waste Division	Fleet Administration Division
Fleet Maintenance	Both Fleet Maintenance programs utilize CCG Faster for the majority of their shop needs, including asset, parts, work orders, fleet maintenance and fuel management. *NOTE: We have made recommendations that will improve how the Solid Waste Division's Fleet Maintenance uses the program to monitor operations at FL.3.*	**X**	**X**
Fleet Maintenance	The FAD utilizes the Mean Annual Cost Equivalent (MACE), a nationally recognized economic model developed by the American Public Works Association, for determining when to replace vehicles.		**X**
Fleet Maintenance	The FAD has exhibited a commitment to high-quality work, efficiency, and customer service; this is reflected by the Automotive Service Excellence (ASE) certifications attained by nearly all mechanics, the 99% customer service satisfaction survey response received in 2006 and by the number of national awards and recognitions received in recent years.		**X**

Appendix C

Audit area benchmarking

Overhead and Overtime Audit Area Benchmarking

As a part of effective productivity monitoring, periodic benchmarking should be performed to evaluate the effectiveness of Solid Waste Division (SWD) and Wastewater Treatment Division (WTD)'s overhead and overtime efforts in maintaining efficient staffing levels. Additionally, overhead allocations should be evaluated to determine whether costs that benefit the divisions are accurately charged. As a part of the benchmarking process, we have provided both SWD and WTD with the information and reports we used as key performance indicators. We used a superior court ruling, prior audit results, and pertinent Federal regulations for bench marking purposes. We also used internal information to compare division organizations with each other.

Central Cost and FBO Overhead Allocations

- According to the federal Office of Management and Budget Circular 87, budgeted cost allocations should be "trued-up" for actual experience. For internal service funds OMB Circular A-87 requires calculation of budget to actual expense deltas and disclosure of the treatment of any resulting variances. The Circular states that the county should prepare "a schedule comparing total revenues (including imputed revenues) generated by the service to the allowable costs of the service, as determined under this Circular, with an explanation of how variances will be handled."
- OMB Circular A-87 requires adjustments of billed central services, stating "A comparison of the revenue generated by each billed service (including total revenues whether or not billed or collected) to the actual allowable costs of the service will be made at least annually, and an adjustment will be made for the difference between the revenue and the allowable costs. These adjustments will be made through one of the following adjustment methods: (a) a cash refund to the Federal Government for the Federal share of the adjustment, (b) credits to the amounts charged to the individual programs, (c) adjustments to future billing rates, or (d) adjustments to allocated central service costs."
- OMB Circular A-87 does not allow local governments to bill general government expenses. King County recognizes this and provides a credit to its government grants for all central cost allocations. The spirit of the Circular is to prevent payment for general government services which should be shouldered by the general fund. Accordingly, the nexus here is allocating all general government expenses to the general fund. Legal precedence has also been established regarding removal of general government expenses from non-general fund organizations. In recognition of this, in 2008 King County began to remove the salaries and benefits of the County Executive and County Council members from its central cost allocations.

Fleet Maintenance and Management Audit Area Benchmarking

As a part of effective productivity monitoring, periodic benchmarking should be performed to evaluate the effectiveness of the Solid Waste Division (SWD) Fleet Maintenance program's efforts in maintaining efficient staffing levels for the level of fleet served, the services performed, and the work efficiency of personnel. As a part of the benchmarking process, we established a "template" for the SWD Fleet Maintenance program (Appendix G) to use and included benchmarks for key indicative performance areas. Although we did not attempt to benchmark all fleet maintenance areas, an area was benchmarked if the SWD could provide the applicable information attributes were defined. When reviewing the reports, please not the following:

Staff Utilization – Direct vs. Indirect Charges

- Industry standards define direct time or "wrench time" as the time spent working directly with tools on maintenance tasks. Indirect time accounts for time spent on administrative time, clean up time, or other time spent not directly working on maintenance tasks.
- We compared the fleet maintenance program's direct time to its internal Productivity Objective Standard.

Maintenance Metric – Preventative Maintenance (PM) vs. Demand Maintenance (DM)

- The primary objective of a maintenance program is to prevent the failure of an asset before it actually occurs.
- Preventive maintenance (PM) is defined as a schedule of planned maintenance activities aimed at the prevention of unplanned breakdowns and failures. Demand Maintenance (DM) refers to unplanned maintenance (i.e. something breaks, wear outs, parts needing adjustments). Demand maintenance generally results in excess overtime; higher repair costs and has the potential to drastically impact operations.
- Manufacturing industry standards for PM vs. DM ratios vary among specific maintenance facilities; however industry leaders identify an 80% PM, 20% DM ratio as optimal
- Work order data for the years 2005-2007 was pulled from CCG Faster. Work orders were separated into two categories: PM or DM. Using this information, we performed an analysis of the time and cost spent on each activity.

Table MM-1 Summary of Demand and Preventive Maintenance Work orders and Percentages					
	Demand Maintenance	%	Preventative Maintenance	%	Grand Total
2005	10,102	87%	1,468	13%	11,570
2006	9,750	84%	1,790	16%	11,540
2007	10,199	82%	2,180	18%	12,379
Grand Total	30,051		5,438		35,489

General Water Treatment and Solid Waste Area Benchmarking

During the planning of the performance audit Ernst & Young considered potential benchmarking criteria that would be applicable to evaluate both the Wastewater Treatment and Solid Waste utilities against similar operations. Although many performance standard metrics exist for Wastewater Treatment and Solid Waste Handling their use is often hampered by the site-specific characteristics of a given utility. Such characteristics may result in an incorrect "apples to oranges" comparison. Some unique qualities observed with regard to the WTD include the following:

The WTD's scope of operations includes primary and secondary water treatment, post-treatment handling of wastes (e.g. biosolids, processed water and emissions) and the operation and maintenance of primary conveyance mains. However, many local utilities address and manage all conveyance systems within their specific utility districts. Accordingly, the rates, charges, and work completed by the WTD do not include all costs and work associated with the collection and treatment of wastewater from the ratepayers because some of these services are provided and charged by the local utility district and not the WTD.

- The WTD's service area lies in a terrain of high relief. A significant portion of the cost of utility operation is associated with energy use, and key drivers in energy use are the booster pumps used convey the waste. Operations in geographic areas with higher relief are therefore expected to have a higher energy charges to overcome elevation changes to transport the waste.
- The WTD has separate operating and capital budgets. The operating budget is approximately $100 million per year. The capital budget is approximately $202 million per year. Performance metrics may include aspects of both budgets for financial performance.
- Rates charged by the WTD come in two basic forms. Customers whose service was established prior to 1990 pay a standard fee for service. This fee (2009 rates) is $31.50 per residence and $31.50 for every 5,610 gallons for multi-family commercial and industrial customers. However, for post 1990 developed property, a second capacity charge fee is also applied. The supplemental capacity charge fee was developed to ensure that expansions of the WTD system to accommodate new users are paid by these same entities. The 2009 capacity charge is $47.64 per month and the cost is in addition to the monthly rate for applicable users. Given the fact that many utilities have only a single residential utility rate which accounts for expenses in established infrastructure and new construction, rate comparisons can indicate the WTD's fess are artificially low because they do not account for the costs of the new construction.

It should also be noted that many of the published benchmarking figures for water utilities also include costs and infrastructure related to both drinking water and wastewater treatment. In King County, drinking water is handled by separate utility departments.

Given these complexities it is difficult to compare specific utility performance benchmarks against other communities or national averages. However, research conducted by Ernst & Young did identify prior benchmarking efforts completed by King County in the late 1990's.17 Although some of this data is now somewhat dated, it did provide a comprehensive comparison of water treatment operations between

[17] Multi-Agency Benchmarking Study Operations and Maintenance Report, Damon S. Williams Associates, December 1999.

seven major utilities along the west coast of the United States. In addition to King County, operations included Portland, Los Angeles, Central Contra Costa, Orange County, Sacramento, and San Francisco (East Bay Municipal Utility District). Although rate and cost data are difficult to apply given the considerations discussed above, the data did contain benchmarking based on of the number of Full Time Employees (FTEs) for gallons treated, biological oxygen demand (BOD), and total suspended solids (TSS). Comparing WTD current results with the prior data yielded the following observations.

- **FTEs per billion gallons treated** -The benchmarking report indicated that the number of Full Time Employees (FTEs) per billion gallons of water treated ranged between 2.5 and 3.75 in 1997 for the seven case studies. Current WTD records indicate 290 FTEs currently work at the West Point and South Plants and these facilities treat about 73 billion gallons of wastewater per year. These figures translate to 3.9 FTEs per billion gallons, which is slightly higher than the pool of utilities examined in the prior benchmarking study.18
- **FTEs per million pounds of BOD removed** - Biological Oxygen Demand (BOD) is a measure of water quality. High levels of BOD limit the amount of oxygen available for aquatic life. The benchmarking report indicated that the number of Full Time Employees (FTEs) per million pounds of BOD removed ranged between 1.65 and 2.96 in 1997 for the seven case studies. Current WTD records indicate 290 FTEs currently work at the West Point and South Plants and these facilities treat about 142 million pounds of BOD per year. These figures translate to 2.04 FTEs per million pounds, which better than the pool of utilities examined in the prior benchmarking study.
- **FTEs per million pounds of Total Suspended Solids (TSS) removed** -Total Suspended Solids (TSS) is another measure of water quality. High levels of TSS limit the clarity and quality of the water discharges. The benchmarking report indicated that the number of Full Time Employees (FTEs) per million pounds of TSS removed ranged between 1.18 and 2.45 in 1997 for the seven case studies. Current WTD records indicate 290 FTEs currently work at the West Point and South Plants and these facilities treat about 139 million pounds of TSS per year. These figures translate to 2.08 FTEs per million pounds, which would rank the WTD in sixth of the eight cases included in than the pool of utilities examined in the prior benchmarking study.

King County engages in an annual internal performance evaluation and part of the King County AIMs High initiative. Internally, it has set a goal of having water treatment rates increase with the rate of inflation as measured on the consumer price index. The WTD's historic performance is presented in the Figures BE-1 and BE-2 given below19. As shown in this information, the WTD's costs had exceeded this goal by over 6% as of 2007. As previously discussed the current monthly residential charge is now $31.50, and therefore approximately 15% beyond the original target.

[18] We determined that the WTD intends to maintain current staffing levels even after the new Brightwater treatment plant is placed online. If the new 36 million gallon per day capacity were included in the calculations presented above, the WTD's rank would improve to 6th in the pool of eight case studies.
[19] Source WTD 2007 KingStat published data

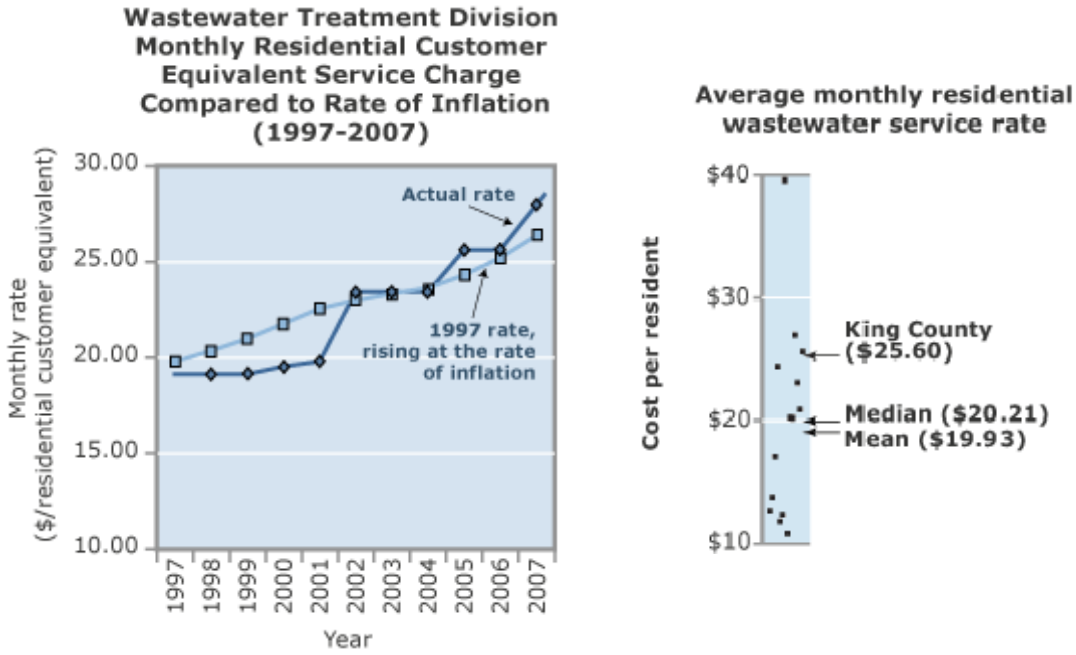


Figure BE-1 and 2 Monthly Residential Water treatment Charges (Not including Capacity Charges)

The Solid Waste Division also contains site specific considerations that hamper the use of common benchmarking metrics such as cost per ton to dispose of waste. Examples include:

The SWD scope of operations includes collections at transfer stations, disposal and maintenance at the landfill, and monitoring and maintenance of closed landfills. The SWD does not engage in curbside collection of waste. This work is handled by private contractors. Hence a comparative analysis of tipping fees is difficult because other vendors' costs would also reflect curbside collection.

The SWD engages in work associated with recycling education and waste reduction which are not often practiced by private firms.

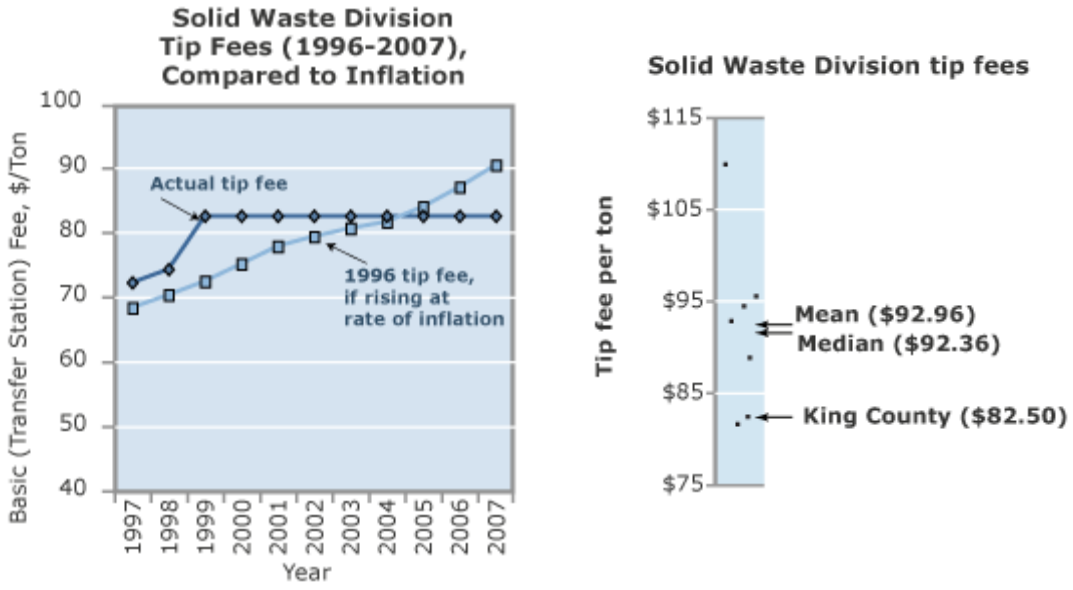
The SWD engages in work associated with Green Building Support and education which are not often practiced by private firms.

To assess SWD operations Ernst and Young examined the Cedar Hills Landfill's Airspace Utilization Factor or AUF. The AUF is a measure of the historic quantity of waste incorporated into a given volume of airspace. Typically the AUF is expressed in lbs per cubic yard (lbs/cyd). In the solid waste industry, AUF is considered a good performance measure because the landfill's key asset is its permitted airspace and the greater the quantity of waste that can be disposed of in a set quantity of airspace the more efficient the operation.

Based on reviews of SWD data, the historic AUF realized for the Cedar Hills site is 1,300 lbs. per cubic yard. In the more recently constructed and operational areas of the landfill new data suggest this figure is slightly higher (over 1,400 lbs/cyd). Ernst & Young's experience in conducting financial audits of private waste management firms has indicated that the industry average AUF is greater than 1,400 lbs per cubic yard at mature sites.

The current tipping charge at the Cedar Hills Landfill is $95/ton. As with the rates charged by the WTD, the SWD also has established a goal of maintaining costs in line with inflation. Figures BE2 and BE-3 presented below[20] illustrated the division's performance as of 2007, prior to the recent rate increase. The current disposal rate is $95/ton. The City of Seattle, which is not part of the King County SWD service area has set fees of $130 per ton through March 9, 2009 and $145 per ton effective January 1, 2010. The City of Tacoma has a fee structure based on the size of containers used by area residents. Residents who self-haul to the landfill may be charged by the ton. The cost for a ton of self-hauled waste for Tacoma residents is $114. King County rates are therefore comparable to other service providers in the region.

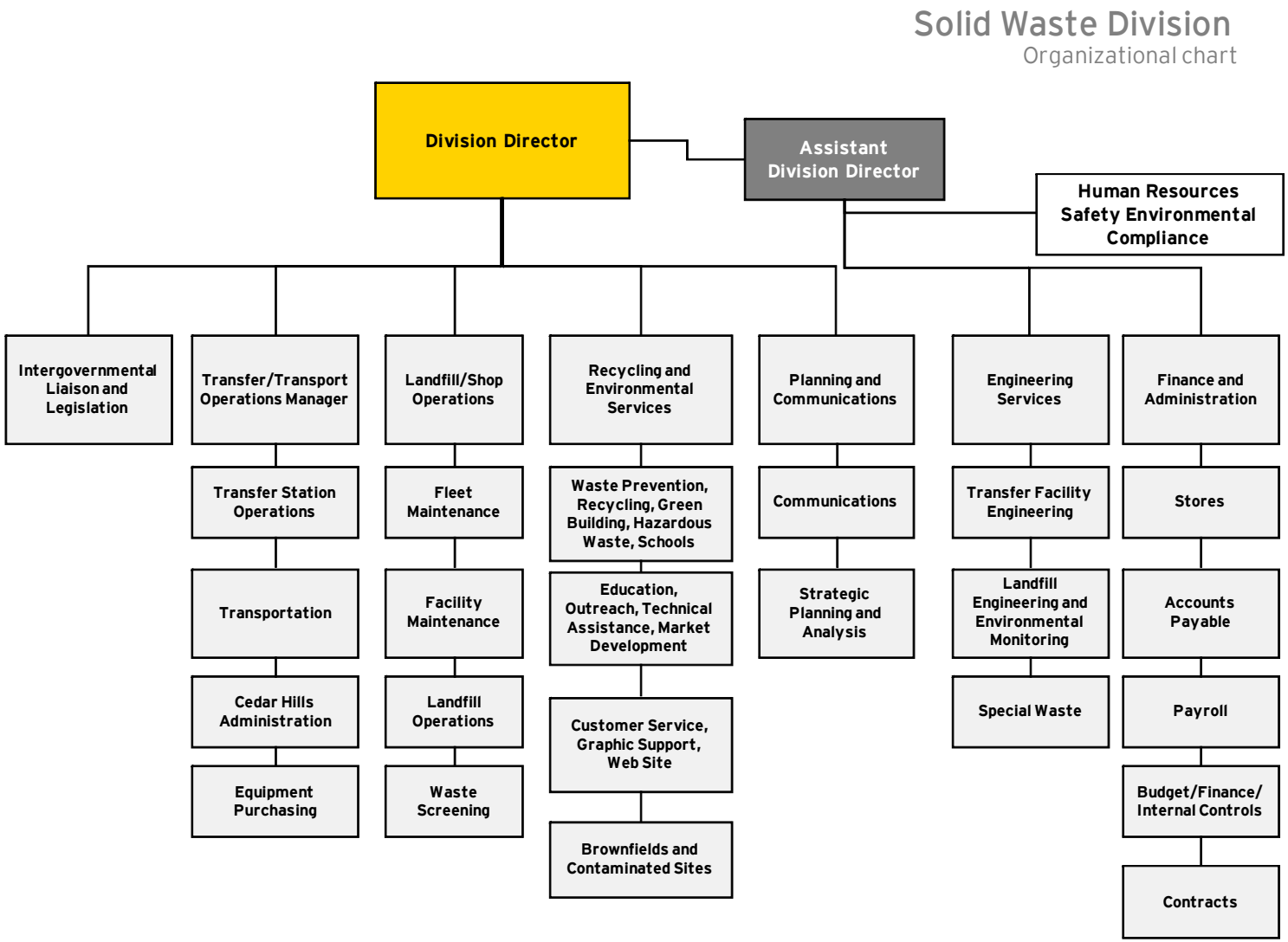
[20] Source WTD 2007 KingStat published data



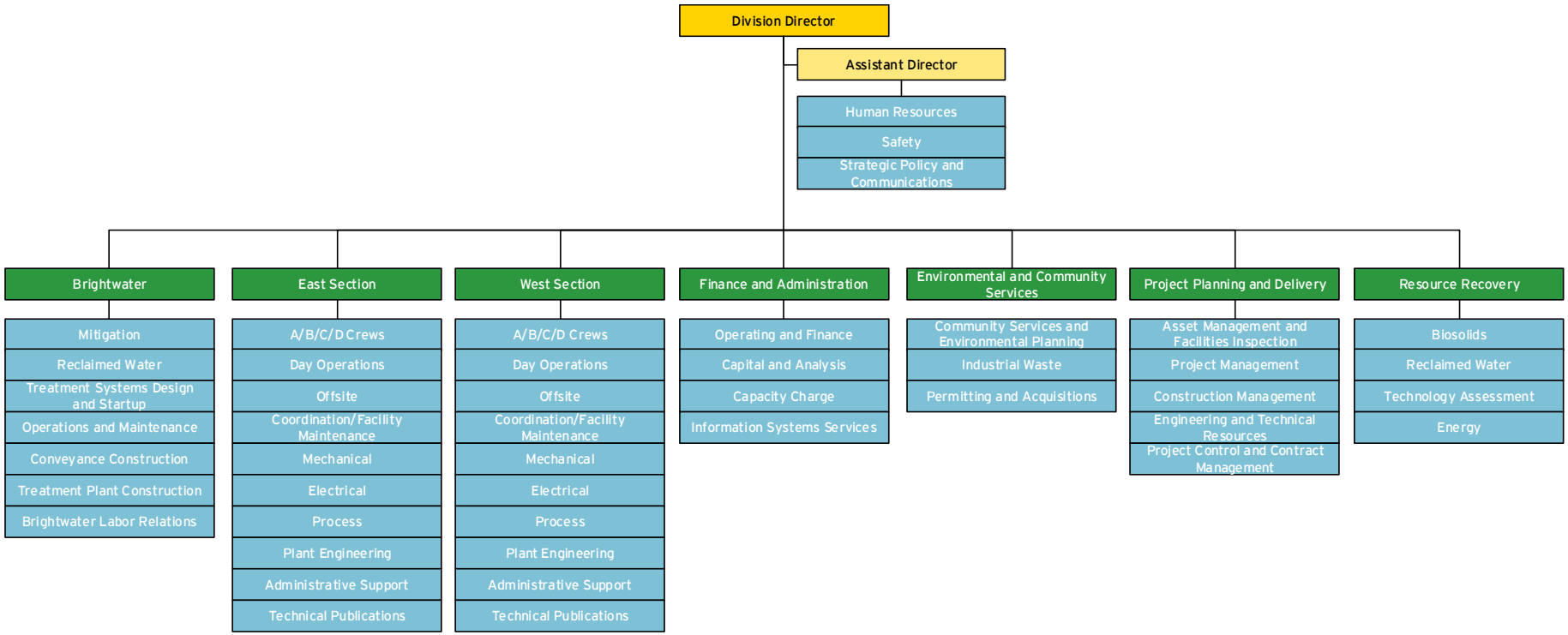
Figures BE-3 and BE-4 Tipping Fees Charged by the Solid Waste Division

Appendix D

Organizational structure of King County Utilities

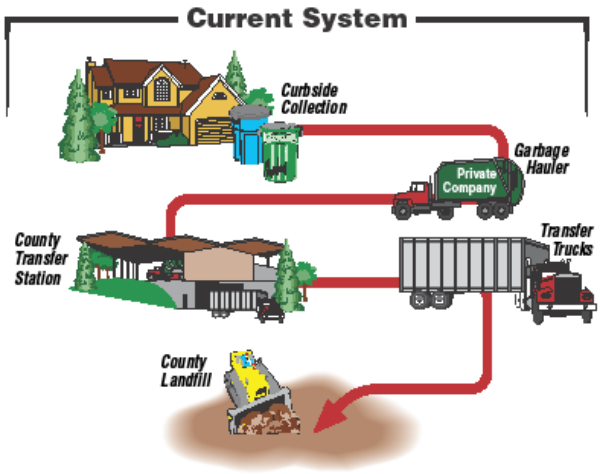


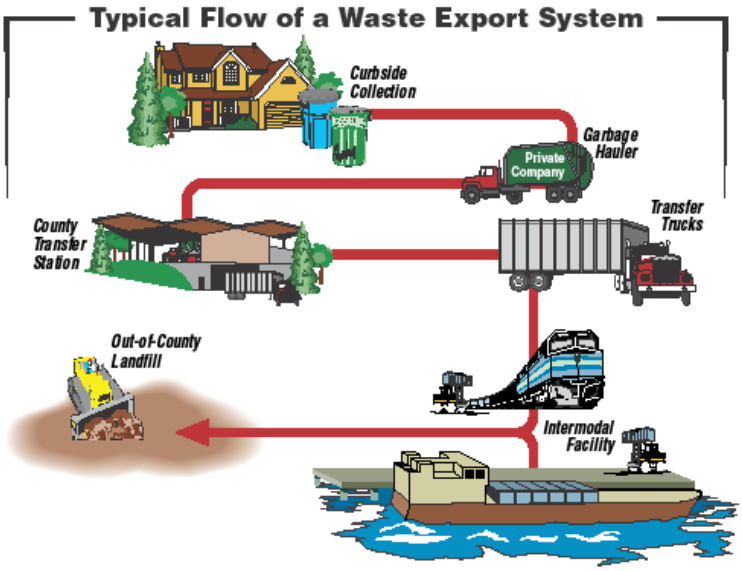
WTD Organization



Appendix E

Solid Waste treatment process diagram

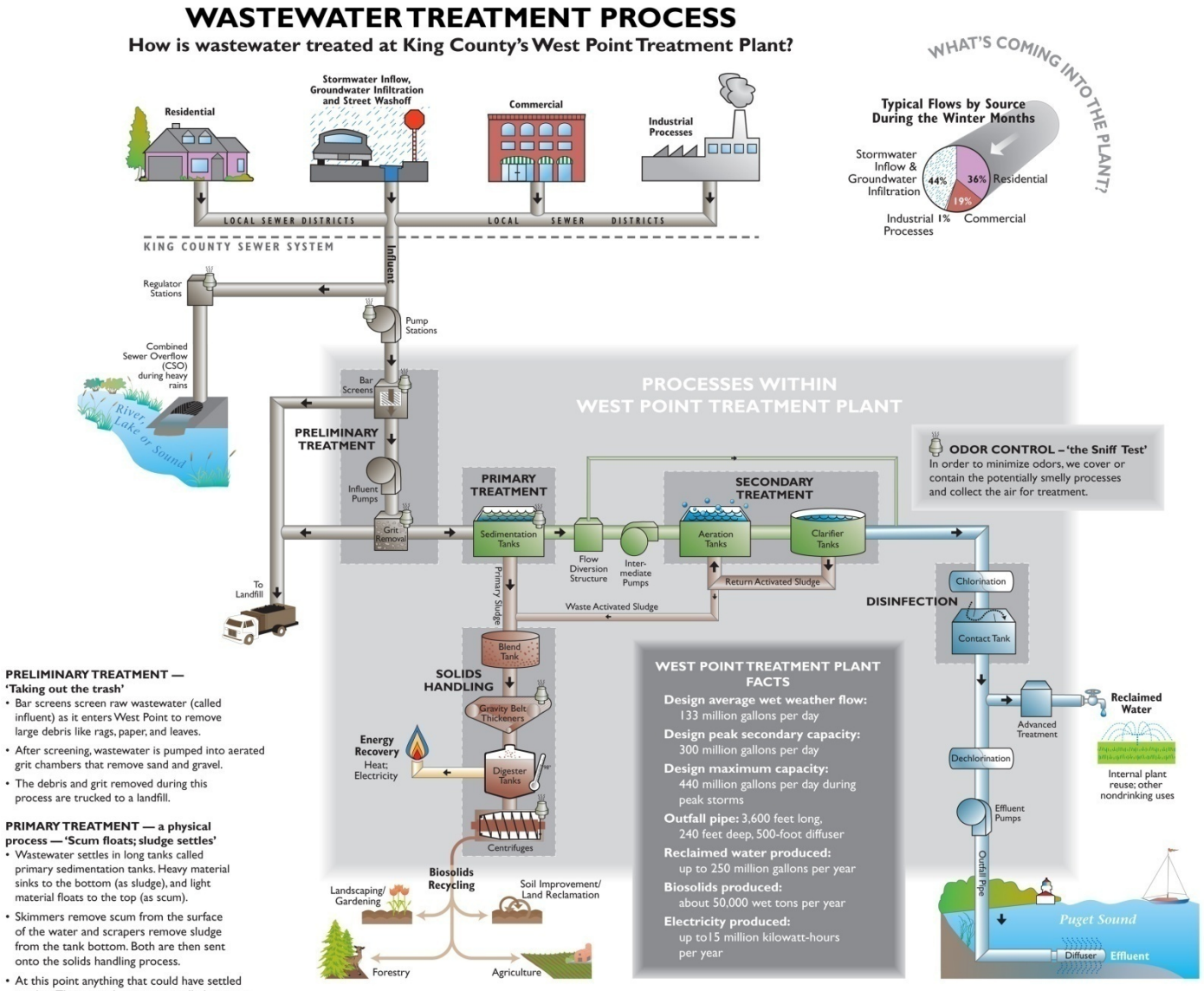




Source: http://your.kingcounty.gov/solidwaste/about/documents/system.pdf

Appendix F

West Plant wastewater treatment process diagram



PRELIMINARY TREATMENT — 'Taking out the trash'

- Bar screens screen raw wastewater (called influent) as it enters West Point to remove large debris like rags, paper, and leaves.
- After screening, wastewater is pumped into aerated grit chambers that remove sand and gravel.
- The debris and grit removed during this process are trucked to a landfill.

PRIMARY TREATMENT — a physical process — 'Scum floats; sludge settles'

- Wastewater settles in long tanks called primary sedimentation tanks. Heavy material sinks to the bottom (as sludge), and light material floats to the top (as scum).
- Skimmers remove scum from the surface of the water and scrapers remove sludge from the tank bottom. Both are then sent onto the solids handling process.
- At this point anything that could have settled out has. The treated water, now called primary effluent, flows to the flow diversion structure.
- West Point is designed to handle a peak combined flow of 440 million gallons a day (mgd).

SECONDARY TREATMENT — a biological process — 'Friendly bugs eating contaminants'

- Primary effluent is pumped to aeration tanks where oxygen is added to encourage growth of useful bacteria naturally present in the wastewater. Bacteria from the end of the treatment process are also recycled—'more hungry mouths to feed'—to speed up the reaction.

King County
Department of Natural Resources and Parks
Wastewater Treatment Division

- Bacteria eat suspended and dissolved organic material in the water. In the process, they produce more bacteria.
- The wastewater then goes to secondary clarifiers, large round sedimentation tanks where bacteria settle to the bottom of the tank as secondary sludge.
- Most (90 percent) of secondary sludge goes back to the aeration tanks to process ("eat") more organic material; the rest goes to the solids handling process.
- The remaining water—secondary effluent—leaves the clarifiers at least 85 percent cleaner than when it entered West Point.

DISINFECTION — 'Zapping pathogens'

- Secondary effluent is chlorinated, destroying most remaining pathogens, or disease-causing bacteria.
- The final effluent is dechlorinated before it is released through an outfall pipe and diffuser into Puget Sound.

RECLAIMED WATER — 'Saving H_2O'

- After disinfection, some secondary effluent undergoes advanced treatment (coagulation, filtration, disinfection) to reduce use of potable water in plant processes.

SOLIDS HANDLING
Creating biosolids — 'Blend, thicken, digest, dewater'

- Raw organic solids—primary sludge and scum and secondary sludge—are blended in a large tank and then pumped to porous conveyor belts that use gravity to drain water off and thicken the material.
- After thickening, the solids are combined with primary scum (not shown) and pumped to digester tanks where anaerobic bacteria at 98 degrees Fahrenheit break down organic material and pathogens. The activity of the bacteria creates digester gas and reduces the solids mass by 50 percent.
- The digested solids are then pumped from digesters to equipment that use centrifugal force to remove water from the solids.
- Water removed from the digested solids goes back to the wastewater treatment process. The resulting dewatered solid material is nutrient-rich biosolids.
- West Point is a nationally recognized member of the National Biosolids Partnership—through its environmental management system—aimed at producing biosolids that are safe for use as a soil amendment.

Appendix G

Recommended fleet performance metrics

Productivity
Staff Utilization: Percent of time related to direct work time vs. indirect time (all support activities). This metric helps management review work load capacities to optimize staffing needs. Note that for this metric we advise that direct time is identified by fleet maintenance staff work hours logged in CCG Faster for hours spent on vehicle repair. Indirect time is the result of subtracting direct time from total time. Total time is total payroll hours for fleet maintenance staff with hours for approved absences (vacation, holiday, etc) removed.

Idle/Wait Time: The time a staff is not active because of waiting for materials or instructions. Codes for this time need to be added to CCG Faster.

Vehicle Down time: This metric provides the amount of time a vehicle is not available for service. The metric can be calculated by hours or days. It measures the potential cost of out-of-service vehicles, which can drain operating budgets. This data is currently collected in CCG Faster; however, it is not summarized into a report.

Quality
Preventative Maintenance vs. Demand Maintenance: This measure calculates the percentage of resources utilized for preventative maintenance (planned work) compared to demand maintenance (unplanned work). An ideal preventive maintenance program spends approximately 80% of resources for preventative tasks and 20% maintenance towards demand tasks. This data is currently collected in CCG Faster; however, it is not summarized into a report.

Vehicle Utilization: Review of all fleet utilization. The goal is to equally disburse miles driven between the SWD fleet tractors. An average annual target should be calculated factoring in distances between Cedar Hills and the various transfer stations. Additionally, a person should be assigned to monitor miles driven per truck on a bi-weekly/monthly basis, and rotate trucks on different routes to balance the miles driven. For this metric the division would need to calculate the expected annual miles per transport trailers, which is calculated by determining the expected annual miles for the transport trailer fleet and dividing by transport trailers in the fleet. This parameter would be compared to actual miles lodged.

Call-back Frequency (rework): This metric identifies maintenance performed that required a vehicle to come back for additional services. It is used to measure the quality assurance and quality control programs, which are important elements to increase repair quality and efficiency, as well as reducing misdiagnosis of mechanical failures. Call back work orders would need to be identified in the CCG Faster work order system.

% of External Maintenance Done: Identifying the capacity to perform work internally opposed to outsourcing to vendors. SWD fleet has taken steps to perform warranty repair work for Kenworth and Caterpillar equipment internally, however the extent to how much work can truly be performed in-house has not been identified. CCG Faster would need to identify external work orders. This would then be divided by the total number of annual work orders.

Timeliness
Work order cycle times: Measurement of how long it takes for a work order to be completed. This is calculated by total number of hours divided by total number work orders.

Appendix H

Glossary of acronyms used in this report

ARMS	Account Records Management System –The accounting system used by the King County Solid Waste Division
AUF	Airspace Utilization Factor – a measure of the mass of waste placed in a given volume (commonly expressed in pounds per cubic yard).
BP	Biosolids Policy
BPT	The Biosolids Program Team within the King County Wastewater Treatment Division
CCG Faster	A software based application used by the Solid Waste Divisions fleet maintenance staff that captures data on repairs and labor.
CDM	Camp Dresser McKee –a contractors retained by the King County Wastewater Treatment Division
CERP	The Capital Equipment Recovery Program in the King County Solid Waste Division
CHRL	Cedar Hills Regional Landfill
CIP	Capital Improvement Project
COBIT	Control Objectives for Information and Related Technology
CX	The King County General Fund
DM	Demand Maintenance
DNRP	The King County Department of Natural Resources and Parks
DoE	The Washington State Department of Ecology
FAD	The King County Fleet Administration Division
FBO	The Finance and Business Operations Division within King County
FEMA	Federal Emergency Management Agency
FTE	Full Time Employees
GAGAS	Generally Accepted Government Accounting Standards
GAO	The federal General Accounting Office
GPS	Global Positioning System
IBIS	Integrated Business Information System – The accounting system used by the King County Water Treatment Division.
IT	Information Technology
ITGC	Information Technology General Controls
IUOE	International Union of Operating Engineers
LEOFF	Law Enforcement Officers
LNG	Liquefied Natural Gas
MSA	One of two payroll systems (the other being PeopleSoft) used by King County
MSWLF	Municipal Solid Waste Landfill Facility
MUF	The Multi Use Facility building located at the West Point Wastewater Treatment Plant
MW	Megawatt
MWPAAC	Metropolitan Water Pollution Abatement Advisory Committee
OMB	The United States Office of Management and Budget
PM	Preventative Maintenance
PSE	Puget Sound Energy
QA	Quality Assurance
QC	Quality Control
RCW	The Revised Code of Washington
REIT	Real Estate Investment Trust
RFI	Request For Information
RWSP	The King County Water Treatment Division's Regional Wastewater Services Plan

SAO	The Washington State Auditor's Office
SOP	Standard Operating Procedures
SWD	The King County Solid Waste Division
USDA	United states Department of Agriculture
USEPA	The United States Environmental Protection Agency
WAC	Washington Administrative Code
WTD	The King County Wastewater Treatment Division

Appendix I

King County responses to audit findings

King County

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September 3, 2009

Brian Sonntag
Washington State Auditor
Insurance Building
Post Office Box 40021
Olympia, WA 98504-0021

Dear Mr. Sonntag:

King County appreciates the effort by the Auditor to help the county improve its operations and maximize value to the ratepayer. The utility performance audit provides an opportunity to identify areas where the county can improve its performance, as well as recognize the county's leading practices which are in place, in the areas of central service and finance overhead charges, fleet maintenance management, leachate recirculation, overtime expenses, biogas use, biosolids management and information technology access.

The county already has taken action or is developing improvements in many of the areas addressed by the audit, including fleet maintenance management, extending the life of the Cedar Hills landfill, and the county's central service and finance overhead charges for the 2010 budget process. The audit report correctly noted that the county and the utilities already were implementing 22 leading practices prior to the audit and we appreciate this recognition.

One of our main concerns about the audit is that there are 5-year estimates regarding overcharges, cost savings and revenue generating opportunities that we could not substantiate based on our review of the report. We have compared the county's estimates with the Auditor's estimates in Enclosure A. When all of these estimates are combined, the Auditor indicates the county has the opportunity to generate 5-year savings or revenues in the range of $147.5 to $153.1 million, which in our view is grossly exaggerated. Our analysis of the report's findings leads to a more realistic 5-year estimate of $14.7 million or about $3 million per year.
Our detailed response to each finding appears in Enclosure B, which highlights areas of concurrence and areas in which we respectfully disagree. The remainder of this letter summarizes the county's perspective regarding the auditor's review process, several key audit issues and the Auditor's commendations for having already implemented 22 leading practices which were identified during the course of the audit.

Final Report Notification Process

The report notification process for this audit was not consistent with what the county has experienced on prior year audits. Although the county received an initial spreadsheet matrix from the Auditor's consultant in March 2009 about likely issues and recommendations, the county did not receive a complete draft of the written audit report and executive summary until August 14, 2009. Despite our requests for a time extension, the Auditor was only willing to grant 10 business days for the county's review process. Important supporting information associated with cost savings estimates was not provided to the county until late August. When significant factual clarifications and issues were raised by county officials as part of exit conferences in late August, the audit team manager granted a few extra days of review but this was still insufficient given that the county was required to wait until September 2 to receive a final and complete copy of the audit report.

In our view, the technical issues and factual clarifications discussed during the exit conferences could have and should have been resolved at a much earlier stage of the audit process. The county questions why a preliminary draft report could not have been released soon after receiving the consultant's matrix of issues and recommendations. While we appreciate that the Auditor's team was willing to reassess its statements about several key issues, and we understand that reasonable people can differ in their interpretation of information, the county questions why it was limited to such a compressed review period of the draft report when meetings prior to the exit conferences would have been useful to avoid tensions and last minute changes to the final report. Our conclusion is that the audit notification process was not consistent with the State Auditor's own protocols for conducting audits (Washington State Auditor's Office Protocols, January 2009). We would like to meet with you to discuss our perspectives about recent audit experiences.

General Government Overhead Charges

We are particularly concerned with the audit issue stating the county allocated $60.4 million in "questionable" general purpose government expenses to the utilities and other non-general fund departments from 2005 to 2009. Our review indicates the Auditor's finding is inconsistent with state law and overlooks the substantial oversight that the King County Executive and King County Council, including their respective staffs, provide to the utilities and other non-general fund departments.

The county's current policy for allocating general purpose government expenses is consistent with state law and government accounting principles, based on the advice of outside consultants, and insures that each department, including Wastewater Treatment Division (WTD) and Solid Waste Division (SWD), pay for their fair value of the services received from other county departments. In contrast, the Auditor's recommendation is – as explained in our response – based on inapplicable or inappropriate guidance.

As part of the 2008 adopted budget, the county made a policy decision to remove the salaries of elected officials (the Executive and Councilmembers) from the general government overhead allocation formula. The county took this action in an attempt to accommodate the Auditor's

previous concerns without compromising the county's position regarding its longstanding methodology for allocating overhead. The county will continue to review and refine its methodology in the future by reinforcing how the utilities and other funds are benefiting from the services provided by the offices of the County Executive and County Council.

Notwithstanding our major concerns about this issue and the grossly overstated cost savings estimate of $60.4 million, we do agree with the Auditor that there needs to be a timely method for making adjustments between planned and actual expenses that are charged to the utilities. The general service and finance overhead charges will be adopting the best practice of adjusting the budgeted overhead rates to actual expenses on an annual basis in the 2010 budget process. The amounts cited in the audit report for SWD and WTD for a five-year period are $650,000 and $750,000, respectively or $130,000 and $150,000 per year respectively.

Solid Waste Division Issues

With respect to the potential cost savings identified for the Solid Waste Division, the majority are associated with extending the life of the Cedar Hills landfill – a course the division has been pursuing for the last several years. The Solid Waste Division recommended maximizing the capacity of the Cedar Hills landfill in the 2006 *Solid Waste Transfer and Waste Management Plan*. The plan was approved by the King County Council in December 2007 and the division began the process of updating the Cedar Hills Site Development Plan.

Currently under consideration are five alternatives for development that would extend the life of the landfill an additional 3 to 13 years. Two of the alternatives include relocation of support facilities, including the shop. The plan is currently in the environmental review phase and a draft environmental impact statement will be issued this fall. Based on the environmental review, operational feasibility, and cost, a preferred alternative will be identified and recommended to the King County Council for approval. Selection of an alternative before completion of the environmental review would be inappropriate and not consistent with state law.

While the county agrees that there will savings associated with extending the life of the landfill, the auditor did not account for any costs associated with the alternatives being considered in developing the potential savings number. Additionally, if an alternative were to be selected that included landfilling in the area currently occupied by the shop facilities, this would likely not begin, and associated savings would not be realized, until 2026 or later.

Regarding the leachate recirculation recommendation, the Solid Waste Division has serious concerns about the auditors' one-sided focus on the benefits of this project without a fair discussion of the significant costs and constraints associated with this type of project in our already wet climate. Adding water to areas of the landfill that are already closed and capped would be prohibitively expensive and offset any presumed cost savings.

Water saturation in a landfill can also lead to drastic differential settlement, leachate and gas system piping failure, slope failure, excess odor, and bottom liner failure. The division has made a deliberate effort to minimize water in the active area, because historically water has interfered

with gas collection and control and has increased the potential for odor. Additionally, the majority of landfills with operating leachate recirculation systems are located in rural and non-residential zoned areas, while the Cedar Hills landfill is bordered by residentially zoned properties on three sides, increasing the likelihood of off-site impacts should problems occur. Note that the county settled a class action lawsuit involving odor at the landfill several years ago and any similar lawsuit settlements in the future would undoubtedly negate the benefits from leachate recirculation.

The county believes the Auditor's proposal on leachate circulation is misleading because it fails to describe the costs and risks associated with the project and assumes savings which cannot be proven without further extensive study. As noted in the audit report, a determination of savings would require a full engineering analysis which has not been conducted.

In the eight issues identified in the Fleet Management Section of SWD, the division already has implemented improved processes relating to overtime costs, the ratios of preventative to on-demand maintenance and direct labor to total labor, quality assurance and control activities, performance measures, and damage reporting. SWD continues to use life cycle costing for capital expenditures. SWD is assessing alternatives identified for expansion of the landfill and plans to conduct an engineering study of leachate recirculation.

Management continues to analyze and review staff overtime, within the constraints of the collective bargaining agreements. We noted in our audit response that 94 percent of overtime expenses are to cover absences due to sick leave, vacations and training requirements. The overtime coverage is needed to ensure that transfer stations and the landfill are fully meeting public expectations for service and regulatory requirements.

Wastewater Treatment Division Issues

The audit report states that the WestPoint Treatment Plant's biogas or "waste to energy" capital project tripled in estimated construction costs and the power generation capital project will cost $952,000 per year. The "waste to energy" project was one of more than 60 design and construction projects managed by WTD. This project was unusual due to the technologically complex alternatives to be analyzed and evaluated from both performance and economic perspectives, within a very constrained project site and during a time when costs in the construction industry were extremely volatile. Based on pending negotiations with Seattle City Light on the sale of Renewable Energy Credits from the power generation project and the finalization of EPA grant funding, the project is expected to be cost-effective.

WTD is a national leader in Biosolids Management. The National Biosolids Partnership has included a number of WTD's practices in its Code of Good Practices, specifically strategic planning and independent audits of the program. Strategic planning has been a core concept of the program and a long term strategy was detailed in the 1999 Regional Wastewater Services Plan. As part of its strategic planning process, prior to the audit, in July 2008 WTD conducted a Request for Information (RFI) on alternative Biosolids management options. An analysis of the options was conducted and presented to the County Council in June 2009. WTD will also be

drafting a comprehensive Biosolids Strategic Plan that will incorporate best industry practices and performance measures.

WTD is preparing to enter into negotiations for its biosolids land application contracts and will have opportunities to re-examine the appropriate market value for its product. At this time, it is questionable whether spending more time on marketing would provide any appreciable benefit to the biosolids program because WTD already sells 100 percent of its available product to a limited number of customers each year. Notwithstanding these current limitations, WTD will continue to review opportunities to promote the benefits of using biosolids in order to keep markets strong. WTD will also seek to maintain and increase revenue from selling biosolids based on market economics.

Management continues to analyze and review staff overtime, within the constraints of the collective bargaining agreements. WTD will work with OMB to analyze its budgeted vacancy rates, with consideration of other factors, and then forecast and adjust its budget accordingly.

Information Technology Issues

The audit points to weaknesses in providing access controls for the data center and information systems, as well as not meeting industry standards for managing system changes. Improvements have already been made to address the access control issues. During the audit, county IT staff conducted reviews and modified access permissions based on the reviews. The frequency of access reports/logs have also been increased. The county is currently involved in a major relocation of its data center and will have inherent controls in place by October 2009. A countywide change management project is also underway.

Leading Practices Already in Place

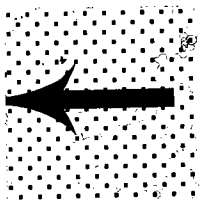
We appreciate the Auditor recognizing the county for already implementing 22 leading practices in the areas of countywide performance reporting systems, rebating charges for overhead financial services, landfill operations, treatment plant operations, biosolids management and fleet maintenance. The "Summary of Leading Practices" table clearly demonstrates that the county's elected officials, managers and employees are fulfilling commitments and providing citizens and ratepayers with maximum value.

Thank you for the opportunity to respond to the performance audit and we looking forward to fully implementing those recommendations with which we agree. We also are committed to sustaining a positive and collaborative relationship with the State Auditor during future audits and hope that our feedback about the final report notification process is taken in this context.

Sincerely,

Pam Bissonnette for

Kurt Triplett
King County Executive



Enclosures

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Ken Guy, Director, Finance and Business Operations Division, DES

Enclosure A-June 2009 King County Utility Performance Audit
Comparison of Potential Cost Savings & Revenues
State Auditor (SAO) and King County (KC)

The audit report grossly overstates the potential cost savings for overhead, which are approximately $1,400,000 for the divisions within the scope of the audit.

Issue Area	SAO	SAO	KC	KC
Overhead	**5-Year Potential Cost Savings**	**5-Year Overcharge of costs allocated**	**5-Year Potential Cost Savings**	**5-Year Overcharge of costs allocated**
Solid Waste Division	$650,000	$4,900,000	$650,000	$0[1]
Wastewater Treatment Division	$750,000	$4,800,000	$750,000	$0
Transit[2]	$3,700,000	$27,300,000	$0	$0
All County funds (including WTD, SWD and Transit)	$10,200,000	$60,400,000	$1,400,000	$0

Wastewater Treatment Division:

The audit report does not overstate potential cost savings and revenues.

Issue Area	5-Year Potential Cost Savings	5-Year Potential Revenue Opportunities	5-Year Potential Cost Savings	5-Year Potential Revenue Opportunities
Overtime expenses	$6,650,000	-	$6,650,000	-
Biogas use	-	$2,700,000	-	$2,700,000
Biosolids management	-	$1,000,000	-	$1,000,000
Totals	**$6,650,000**	**$3,700,000**	**$6,650,000**	**$3,700,000**

[1] Central services overhead includes appropriate costs and are subject to allocation to departments
[2] Transit was not in original scope of audit, all references should be removed from report.

Enclosure A-June 2009 King County Utility Performance Audit
Comparison of Potential Cost Savings & Revenues
State Auditor (SAO) and King County (KC)

Solid Waste Division:

The audit report overstates potential cost savings by $65 to $68.6 million.

Issue Area	SAO	SAO	KC-SWD	KC-SWD
	5-Year Potential Cost Savings	**5-Year Potential Revenue Opportunities**	**5-Year Potential Cost Savings**	**5-Year Potential Revenue Opportunities**
Fleet maintenance management-landfill	$25,000,000	-	No savings attributable to audit issue[3]	-
Fleet maintenance management	$11,000,000 to $14,600,000	-	Insufficient data to evaluate[4]	-
Leachate recirculation	$29,250,000	$1,150,000 to $3,150,000	Insufficient data, but potentially would incur additional costs, not savings[5]	$1,150,000 to $3,150,000
Overtime expenses	-	-	$156,000 to $222,000 more likely[6]	-
Totals	**$65,250,000 to $68,850,000**	**$1,150,000 to $3,150,000**	**$156,000 to $222,000**	**$1,150,000 to $3,150,000**

SWD estimates savings and revenues of $156,000 to $222,000 and $1,150,000 to $3,150,000, respectively, significantly less than those suggested by the Auditor. The Auditor's analysis does not account for any costs associated with the alternatives that will extend the life of the landfill. The Auditor's analysis also incorrectly portrays the savings as near term, when savings will not be realized until 2026.

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[3] SWD is currently analyzing and cannot make determination until the environmental review under SEPA, and other analyses are completed.

[4] Analysis does not recognize higher costs associated with operating a 40+ year old system, SWD has made significant improvements since audit, which are not recognized; basis for analysis uses "rules of thumb"

[5] Auditor calculation does not factor costs associated for leachate recirculation. E&Y recommended an engineering study, due to the many variables.

[6] Using overtime to fill short-term needs caused by sick leave, vacation and training requirements (94% of OT) is more cost effective than hiring additional staff with associated benefits.

Central Service and Finance overhead charges

Issues and Recommendations – Central Service overhead charge

Issue OH.1. King County cost allocations for central services are not adjusted to reflect actual expense which has resulted in increased costs to ratepayers from 2005, 2006 and 2007. Allocations for finance and business operations expenses also are not adjusted to reflect actual expenses.

Recommendations
Ernst & Young recommends that King County develop and implement a policy that requires adjustments to billed cost allocations to account for actual experience for both cost pool and allocation bases, preferably as significant discrepancies between budget and actual expenses are discovered. At a minimum, it should be done in the beginning of the subsequent fiscal period. We recommend this be applied to both Central Services and Finance and Business Operations where similar conditions were identified.

Clarification of Issues Section
Under Effects of recommendation (page 13), E&Y states that "We could not perform a calculation of the estimated savings, if any, that could be achieved by adjusting finance and business operations allocations to reflect actual expenses, as the complexity of the allocation model used would require extensive effort and modification to perform." Information was provided to E&Y during the audit, that demonstrated that through FBOD's rebate process, agencies have not been overbilled over time.

For 2005, 2006, and 2007, Finance and Business Operation Division(FBOD)'s actual revenues and expenditures are shown below. This information was also provided to E&Y during the audit.

Category	2005 Actual	2006 Actual	2007 Actual	3yr Total
Rate Revenues	25,521,301	25,952,901	27,559,755	79,033,957
External Revenues	1,815,429	2,241,992	2,247,017	6,304,438
Total Revenues	27,336,730	28,194,893	29,806,772	85,338,395
Total Expenditures	(27,404,159)	(27,603,205)	(30,479,309)	(85,486,673)
Variance	(67,429)	591,688	(672,537)	(148,278)
% Variance between cost of services and revenues	0.25%	-2.14%	2.21%	0.17%

The Table above illustrates that the FBOD had $148,000 variance between the expenditures and revenues which was less than 0.2% of total expenditures of $85,000,000 for the three year period. Over 90% of the total revenues are from internal service rate FBOD bills other county agencies. This demonstrates that the rebate, although it does not provide the reconciliation to the actual, appear to have worked as a mechanism to control the surplus, thereby not overbilling the agencies over time. For the three year period, there would have been no cost savings for FBOD rate, but a small amount ($148,000) that would have been billed out to the county agencies if the "true-up" to the actual expense were performed.

Ongoing Activities Relevant to this Issue
Concur with recommendation

Following the recommendation made in the audit report, FBOD implemented a reconciliation process in its rate model for 2010 budget process. FBOD has proposed the 2010 Finance rate which now includes adjustments of billed rates to actual expenses of cost pools and actual experience of the allocation basis. The reconciliation resulted in savings for some funds and increased costs for some other funds based on the actual transaction counts and service levels provided to each agencies.

Similarly, Office of Management and Budget (OMB) has adjusted the central services cost allocation plan to "true up" the budgeted and actual expenditures for the 2010 budget process. Adjustments based on actual levels of activity will be made over time.

Issue OH.2 – King County allocates questionable general government expenditures to all funds.

Recommendations
Ernst & Young recommends that King County develop and implement a policy that requires adjustment to the central services allocations to eliminate all questionable County Council and county executive expenses. The prior audit findings, and a relevant legal decision in Seattle clearly indicate that unless an actual service has been provided and documented, general government expenses should be funded by the general fund. King County recognizes this and removes salaries and benefits for the County Executive and the County Council members. However, the associated expenses for these elected officials should also be removed, including the County Council, Council Administrators, County Executive and the Office of the Excutive.

Ongoing Activities Relevant to this Issue
We do not concur with the Issue or recommendation.

The County disagrees with the Auditor's Issue OH.2 because it is inconsistent with state law and overlooks the substantial oversight that the King County Executive and King County Council provide to the departments referenced in the Issue.

State law requires that the costs of goods and services provided between governmental departments be accounted for at their "true and full value." *See* RCW 43.09.210. The County's overhead allocation policy, which allocates general government charges based on total adjusted operating expenses, complies with state law. The County's current policy for allocating general purpose government expenses is based on the advice of outside consultants, and insures that each department, including WTD and SWD, pay for their fair value of the services received from other county departments. The County allocates a small portion of the County Council, Council Administrator, County Executive, and Office of the Executive to the WTD, SWD, and Transit as a result of the substantial oversight and policy direction provided to those departments.

The County is particularly concerned about the Audit condition which states the County has inappropriately allocated $60.4 million in general purpose government expenses to the utilities and other non-general fund departments from 2005 to 2009. Our review indicates the Auditor's opinion is inconsistent with state law and overlooks the substantial oversight that the King County Executive and King County Council, including their respective staffs, provide to the utilities and other non-general fund departments.

We also disagree with the Auditor's statement that the County "recognizes" that the allocation of general government expenses is inappropriate. In 2008, the County made a policy decision to remove the salaries of elected officials (the Executive and Councilmembers) from the general government overhead allocation formula. The County took the action in an attempt to accommodate the Auditor's concerns without compromising the County's position.

Notwithstanding the fact that the County disagrees with this finding, we also contend that the estimate of $60.4 million is grossly over-stated because it includes $27 million charged to Transit which does not impact utility rates for solid waste or wastewater treatment and which was not part of the original scope of the audit, as stated below:

> *"Scope*
> *The performance audit focused on two King County Utility operations:*
> - *King County Solid Waste Division (SWD)*
> - *King County Wastewater Treatment Division (WTD)."*

According to the Yellow Book, Chapter 7 Field Work Standards for Performance Audits, 7.09 "Scope is the boundary of the audit and is directly tied to the audit objectives. The scope defines the subject matter that the auditors will assess and report on, such as a particular program or aspect of a program..."[1]

We have respectfully requested the auditor remove the references to Transit and other county funds, since they were not in the original scope of the audit, and the results of the audit are significantly misconstrued.

The Auditor's issue and related recommendations regarding general government overhead allocations are based on inapplicable guidance as explained below:

- OMB Circular A-87 referenced by the Auditor does not apply, as it refers to federal awards. While the County may prepare an external cost allocation plan in accordance with the circular to recover allowable overhead from federal awards, the circular does not apply to internal cost allocation plans, which are the subject of the Auditor's Issue OH.2.

- The Auditor's Issue OH.2 also misstates the *Okeson* decision, which supports the county's approach. The *Okeson* decision referred to by the Auditor is a superior

[1] GAO-07-162G Government Auditing Standards, page 119

court decision not involving the County. That decision, however, acknowledges that a department that receives a government service "must" pay the cost of providing that service. Consistent with the *Okeson* decision, the allocation methodology the county employs in allocating general governmental charges accurately reflects the costs of the services and benefits WTD, SWD, and Transit receive from other departments.

- The Auditor's prior finding in September 27, 2005 is reflected in the County's current practices. Legal restrictions do not prohibit the County from charging a portion of the general government costs to WTD, SWD, and Transit on general government costs. The current cost allocations reflect the true and fair value of benefits and services received by WTD, SWD, and Transit from the County Council, Council Administrator, County Executive, and Office of the Executive.

Although the County disagrees with the Auditor's Issue OH.2, the County is committed to a continued review of its allocation methodology and will continue to evaluate its methodology on an on-going basis.

Fleet maintenance management

Issue FL.1 – Monitoring and managerial controls are not adequate to control costs and priorities of the fleet management program.

Recommendations
Management monitoring controls can be enhanced by ensuring management personnel advocate the County's interests by changing business processes and apply monitoring tools and technology. Fleet management should consider using technology to enhance management control and efficiency over business practices. For example, fingerprint based biometric time clocks can be used to track employee time. In addition, management should challenge the use of technology as a management right and document it in union agreements. Management should also improve communication between maintenance and operations at the staff levels. In addition, departments and organization units should be integrated and understand the business impacts a decision can make within the overall organization. We recommend operations and Fleet Maintenance meet to discuss high-level metrics, leading practices, improvement ideas and to identify/rectify issues.

Clarification of Issues Section
SWD currently utilizes a number of data management systems, such as GPS and CCG Faster (our maintenance management system) to manage and monitor process and performance.

Management uses recently developed weekly and biweekly overtime reports to enhance our managers, supervisors and leads ability to monitor staff performance and efficiencies to control overtime in our 7 day a week operation.

Managers, supervisors and leads monitor daily equipment damage reports, developed in mid 2008, to initiate investigations into potential employee abuse of equipment. Investigations may lead to discipline or uncover a systemic process problem that requires change.

Since early 2008, demand maintenance has decreased through the implementation of an aggressive facilities- equipment preventative maintenance inspection program. This program, which places a senior mechanic in the field inspecting facilities and equipment for potential breakdowns that can be corrected before they become demand maintenance with a resultant decrease in equipment and facility down time.

Meetings across operation's sections occur on a weekly or monthly basis. These meetings discuss potential impacts to landfill operations, shop, transfer stations, and transportation due to process or procedural change, considering potential impacts to each section to ensure that changes are incorporated and integrated throughout the operations system.

SWD operates in accordance with the collective bargaining agreements, preventing additional costs that would be incurred by not doing so. SWD exercises its management rights to the utmost degree when the item or issue falls within such rights. If such rights are challenged, the SWD aggressively asserts its' management's rights when appropriate and necessary and

engages in bargaining of the decision and/or effects when appropriate. SWD is pursuing the installation of cameras at transfer stations through negotiations with the representing union as directed by the Washington State Public Employee Relations Commission.

Ongoing Activities Relevant to this Issue
Partially concur with recommendation

Management will continue to use and improve upon the meetings, reports and processes described above. What has been implemented within the last 18 months has been highly successful, making SWD operations more effective and efficient. Management understands that we still can improve and will continue to do so.

Issue FL.2 – The SWD Fleet Maintenance program spends more than 82% of its time on unplanned maintenance, resulting in higher costs, increased overtime and increased rates charged to ratepayers.

Recommendations
Fleet management should shift priorities from being reactive to being more proactive in its maintenance activities. To accomplish this, fleet management should perform ongoing analysis of DM work orders to identify themes/areas of avoidable repairs. Metrics should be put in place to continuously track the number of occurrences of these types of repairs by employee, root cause and location to increase accountability.

Ongoing Activities Relevant to this Issue
Concur with recommendation

SWD agrees that the ratio of preventative to demand maintenance should be higher and is taking steps to achieve this goal, including renovating the transfer system.

A more "operationally friendly" design incorporating compactors will significantly decrease the abnormal amount of wear and tear to which our equipment is currently subjected, and in turn, demand maintenance. Additionally, a program focusing on preventative maintenance of long-haul tractors (trucks) began in June 2008. As a result, on-demand repairs of trucks have dropped by approximately 25% and the overall cost of maintaining the truck fleet decreased by approximately $60,000 in the first nine months.

SWD now routinely tracks damage by type of repair, employee, root cause, and location. As appropriate, action is taken to hold employees accountable.

Issue FL.3 – The Solid Waste Division's Fleet Maintenance program does not have a formal documented process for quality control (QC) inspections of mechanical repairs nor do they perform the quality assurance (QA) inspections required by Standard Operating Procedures (SOP).

Recommendations
Fleet management should shift priorities from being reactive to being more proactive in its maintenance activities. To accomplish this, the County needs to ensure QC procedures are conducted by management who are committed to efficient and effective operations.

Ongoing Activities Relevant to this Issue
Concur with recommendation

SWD is taking steps to improve QA/QC. Defined criteria are being added to the preventative maintenance addendums to ensure quality service and facilitate quality control. For example, the brake inspection section of the previous addendum said, "visually inspect brakes for proper operation", now the addendum clearly states control limits on brake assemblies – measurements, wear limits, abnormal wear tolerances, dimensions, movement etc. We are in the process of applying these methods to all preventative and demand maintenance work.

Performance measurements are being developed to verify that the process is working and/or what needs to be adjusted to make it more effective.

Issue FL.4 – The Solid Waste Division's Fleet Maintenance program does not track the performance measures against maintenance goals established in its Standard Operating Procedures Manual.

Recommendations
Fleet management should make performance measurement and accountability a priority. To accomplish this, the County needs to ensure performance measures are collected, measured, and compared to performance goals by management who are committed to efficient and effective operations. Specifically, Fleet Management should review business processes to make sure that data input into the CCG faster system (fleet maintenance time and labor tracking application) is captured accurately and should continually monitor data integrity. This will allow management to develop accurate reports to track operational performance. Management should consider co-developing performance metrics with maintenance staff and operations. Metrics to consider are included in Appendix G Suggested Fleet Performance Metrics.

Ongoing Activities Relevant to this Issue
Concur with recommendation

As a part of the department's performance measure program, section level measures are being developed. The division will consider the suggested performance metrics.

Issue FL.5 – The Solid Waste Division's Fleet Maintenance program does not effectively use damage reports to track damage caused by Fleet Management drivers.

Recommendations
Fleet management should make performance measurement and accountability a priority. To accomplish this, the County needs to ensure performance measures are collected, measured,

and compared to performance goals by management who are committed to efficient and effective operations. To effectively implement the program, management should foster communication between maintenance and operations. We recommend two general body meetings with operations and fleet maintenance to discuss high-level metrics, leading practices and identify/rectify issues and improvement areas. Management should also explore incentive programs for reduced damage on equipment and develop a process to effectively capture and take corrective action to address the cause of the damages.

Current policies and procedures related to damage reporting should be followed.

Clarification of Issues Section
SWD disagrees that the condition as portrayed in the report currently exists.

Since late 2007 SWD operations management has instituted several new programs, processes and reports to correct the noted condition. Managers, supervisors and leads monitor daily equipment damage reports, developed in mid 2008, to initiate investigations into preventable equipment damage. Investigations may lead to discipline or uncover a systemic process problem that requires change. Accountability has increased and preventable equipment damage has noticeably decreased. Since early 2008, demand maintenance has decreased through the implementation of an aggressive facilities equipment preventative maintenance inspection program.

SWD disagrees that this cause occurred. When the damage tracking system was developed, the entire operations leadership team (managers and supervisors) participated in its' development. Implementation was not begun until all members of the leadership team agreed with and understood the process.

Ongoing Activities Relevant to this Issue
Partially concur with recommendation

SWD follows current policy and procedures related to damage reporting.

Since late 2007, SWD operations management has instituted several new programs, processes, and reports to track damage. Managers, supervisors, and leads monitor daily equipment damage reports to initiate investigations into preventable equipment damage. Investigations may lead to discipline or uncover a systemic process problem that requires change. Accountability has increased and preventable equipment damage has noticeably decreased. SWD does not intend to explore an incentive program.

Issue FL.6 – The Solid Waste Division's Fleet Maintenance program charges more time to indirect activities, than the benchmark of 20% established by its Standard Operating Manual, resulting in increased maintenance costs, increased overtime, and higher rates charged to utility customers.

Recommendations
Fleet management should make performance measurement and accountability a priority. To accomplish this, the County needs to ensure performance measures are collected, measured, and compared to performance goals by management who are committed to efficient and effective operations. To effectively implement the program, The SWD Fleet Maintenance program should review their business processes and insert controls to enhance integrity of data inputs, understand the key performance indicators (those metrics management can use to best measure maintenance operations performance), and develop reports to monitor those indicators. Management should involve the maintenance staff when identifying the appropriate performance metrics to measure.

Ongoing Activities Relevant to this Issue
Concur with recommendation

SWD continues to make improvements in this area, as demonstrated by the chart in the audit report. During the twelve month period (8/1/08-7/31/09), shop operations direct labor was 75%, which is within 5% of its internal standard of 80%.

Issue FL.7 – The SWD Fleet Maintenance program does not use a life cycle cost model to control maintenance costs, resulting in inefficiencies, increased costs, overtime and higher rates charged to utility customers.

Recommendations
We recommend Fleet Management use the MACE life cycle cost model with reasonable adjustments for the higher wear and repair demands expected for municipal solid waste loading, transporting, and unloading considerations. These adjustments can be based on CCG Faster data that captures actual experience and data included from prior years.

Ongoing Activities Relevant to this Issue
Do not concur with recommendation

SWD agrees a life-cycle costing (LCC) methodology addresses total cost of ownership and serves well the evaluation of competing options in purchasing and improved awareness of total asset costs. The results of LCC analysis can be used to assist management in the decision-making process where there is a choice of purchase options. It is most valuable as a comparative tool when long-term assumptions apply to all the options.

While a LCC model would be valuable for asset purchase decision-making, it is not a replacement for the Capital Equipment Recovery Program (CERP) fund, which serves as the cost/financing method to facilitate asset replacements. Also, LCC may not be the most efficient tool for analysis and/or decision-making involving the timing of specific equipment retirements.

CCG Faster has functionality to aid in equipment replacement calculations in its asset management module. It calculates the original life expectancy of equipment based on age,

but then speeds or slows the expected replacement date based on high or low usage and maintenance dollars.

It would be inefficient to extract information collected in CCG Faster to feed another application (MACE) for tracking asset wear and repairs when CCG Faster has this capability. Rather, efforts are underway to utilize this functionality within the CCG Faster application. In addition, where significant capital asset acquisitions are being considered, detailed and extensive life cycle and cost-benefit analysis will continue to be performed.

Issue FL.8 – The Solid Waste Division can increase the life of the Cedar Hills Regional Landfill two years by relocating Fleet support facilities currently located on the landfill site.

Recommendations
We recommend management select an option that maximizes the use of permitted airspace for depositing waste. Of the available options, those that involve moving the support facilities best accomplish the maximization of available airspace

SWD needs to move quickly because of the time required to obtain proper permits, gain stakeholder support, and identify a suitable alternative site for the support facilities.

Clarification of Issues Section
With respect to the potential cost savings identified for the Solid Waste Division, the majority is associated with extending the life of the Cedar Hills landfill – the division has been pursuing this course for the last several years. The Solid Waste Division recommended maximizing the capacity of the Cedar Hills landfill in the 2006 *Solid Waste Transfer and Waste Management Plan*. The plan was approved by the King County Council in December 2007 and the division began the process of updating the Cedar Hills Site Development Plan. Five alternatives for development that would extend the life of the landfill an additional 3 to 13 years are currently under consideration. Two of the alternatives include relocation of support facilities, including the fleet maintenance shop. The alternatives are currently in the environmental review phase; a draft environmental impact statement will be issued this fall. Based on the environmental review, operational feasibility, and cost, a preferred alternative will be identified and recommended to the King County Council for approval.

Ongoing Activities Relevant to this Issue
Do not concur with recommendation

Selection of an alternative before completion of the environmental review would be illegal. The alternatives under consideration could be developed sequentially, beginning in areas where there are ponds and soil stockpile, but no fleet maintenance or other buildings. Thus if an alternative were to be selected that included landfilling in the area currently occupied by the fleet maintenance facilities, this would likely not begin, and associated savings would not be realized, until 2026 or later. The division has reserved space at the under construction Bow Lake Recycling & Transfer Station for a fleet maintenance facility.

Leachate recirculation

Issues LE.1– The Solid Waste Division can extend the life of the Cedar Hills Landfill which can result in lower operating costs and generate revenue, resulting in lower rates charge to landfill customers.

Recommendations
Based on a preliminary analysis, we recommend that the SWD conduct an engineering analysis to determine the best means of securing potential costs savings from recirculating leachate. Such an analysis would include a detailed analysis of multiple factors affecting the costs to design, permit, construct, and operate a leachate recirculation system. For new cells (e.g. Area 7), construction costs can be minimized by including the infrastructure in the area as it is built. Area 5 also represents a less costly option because it is currently only covered with a temporary cap. The future recirculation analysis would capture these considerations and complex modeling of the biological breakdown of wastes to determine the speed and efficiencies to be expected based on site-specific parameters.

Clarification of Issues Section
SWD has serious concerns about the auditors' lack of consideration of the significant constraints associated with this undertaking in our already wet climate. Water saturation can lead to drastic differential settlement, leachate and gas system piping failure, slope failure, excess odor, and bottom liner failure. The division has made a deliberate effort to minimize water in the active area because historically water has interfered with gas collection and control and has increased the potential for odor. Additionally, the majority of landfills with operating LRC systems are located in rural and non-residential zoned areas, while the Cedar Hills landfill is bordered by residentially zoned properties on three sides, increasing the likelihood of off-site impacts should problems occur. As acknowledged in the audit report, the calculation of estimated savings does not include any costs of installing leachate recirculation (LRC). Failure to recognize the risks associated with this venture and presume savings which cannot be proven without extensive further study is misleading. As noted in the audit report, a determination of savings would require a full engineering analysis which has not been conducted.

Ongoing Activities Relevant to this Issue
Concur with the recommendation

SWD will conduct a study of LRC at Cedar Hills, considering benefits and constraints and risks. However, a previous simulation of LRC using Cedar Hills as a test case (conducted in 2002), did not conclude that benefits would outweigh constraints and costs.

While there are potential benefits from LRC, there are also noteworthy constraints, including localized ponding and water saturation – especially in a wet climate (average annual precipitation at Cedar Hills is between 57 and 62 inches, with 8 to 9 inches per month in November, December, and January). Permits for areas 5, 6, and 7 would not allow LRC; new permits would be required.

Overtime Expenses

Issues and recommendations – approving overtime

Issue OT.1 Water Treatment Division standard shift schedules are structured to include overtime at time and one-half, creating increased costs to ratepayers.

Recommendations
Ernst & Young recommends that WTD seek to negotiate the elimination of unbalanced shifts that result in comp time from long and short weeks, and only include shifts that result in 40-hour workweeks. The current schedule is creating an added burden to the WTD ratepayers. Also, the current economic environment has challenged King County to implement extraordinary cost-saving measures. Removing the unbalanced shifts will save funding without reducing employee hours.

Clarification of Issues Section
In February 2006, WTD created a task force to review treatment plant staffing and shift schedules, exploring ways to save money, increase efficiency, and improve employee health and morale. The work of this committee resulted in findings that resulted in WTD maintaining its rotating shift. Another outcome of the 2006 review that is not mentioned in the audit report is that the County was able to reduce crew size and negotiated a change in the eligibility for overtime in the labor agreement.

The WTD task force, comprised of treatment plant management, supervisors and human relations staff calculated that the 11.7 rotating shift cost approximately 6.5 percent more per shift worker than other common 24/7 shift configurations. The task force also noted studies that suggested the speed and direction of rotation has benefits related to maintaining healthful and more alert shift crews over other types of rotating shifts and fixed shifts providing less quantifiable but direct benefit to the employees and employer. The task force also took another look at the size of the shift crews and their assigned tasks. This additional review discovered new opportunities to increase efficiencies and decrease costs. At the conclusion of the review, the task force was directed by management to maintain the shift schedule while moving to a reduced crew size and a negotiated change in the eligibility for overtime as a means to reduce costs.

Ongoing Activities Relevant to this Issue
Concur with recommendation

While WTD agrees that it is important to re-examine the rotating schedules on a continuing basis and will do so during management's next shift review process and labor negotiations cycle, it is also important to note that the county has successfully negotiated changes to the agreement addressing eligibility of overtime and reduced the size of work crews. The 925 agreement is scheduled for renegotiation in early 2010 and WTD will again review the areas related to shift work and overtime.

Issue OT.2 - The budgeting of vacant positions at the Water Treatment Division is historically understated, resulting in excessive budget allocations and increased rates charged to utility customers.

Recommendations
Ernst & Young recommend that WTD use a higher vacancy rate in their budgeting process to determine the "Budgeted Salary Savings" figure to better reflect current division needs. WTD should prepare an analysis of its annual budgeted vacancy rate including review of historical vacancy rates, with consideration of other factors forecast for the upcoming budgetary period.

Clarification of Issues Section
WTD has successfully managed its vacancies and temporary use of overtime to allow for reclassifications and to fill positions when it added two additional treatment plants, Vashon and Carnation, and is training operators for the Brightwater Treatment Plant. WTD accomplished this while maintaing employee positions at the same level authorized in 2000.

WTD acknowledges that actual vacancies have exceeded the amounts estimated for an on-going vacancy rate in its budget. This effort has been complicated by the need to staff new facilities, a recent capital reorganization, and county-wide hiring freezes to address larger budget concerns. In order to accomplish the needed staffing and meet the requirements of competitive hiring processes without adding FTE's, careful planning was required to create new positions using available vacancies and reorganizing work plans to ensure all critical functions were accomplished.. Through an internal recruitment process, most positions for Brightwater and other new facilities have been identified and staff has begun training for those operations positions. With all planned facilities open and operating, staffing shifts and vacancy rates should stabilize at a lower level.

Under expenditures in salaries due to vacancies were significantly offset by the over-expenditures in the overtime budget. Some portion of the overtime expended during the audit period was incurred to cover vacant positions. The salary and overtime budget line item when compared to actual expenses net was:

1) 2005 - $500,530 or 2.375% of total operating salaries;
2) 2006 - $623,082 or 2.87% of total operating salaries; and
3) 2007 - $24,055 or 0.111% of total operating salaries.

WTD was even more effective in managing its total operating budget. WTD under expended its total operating budget by 2.54% in 2005, by 1.99% in 2006 and 0.85% in 2007.

Ongoing Activities Relevant to this Issue
Concur with recommendation

WTD agrees that budgeted vacancy rate should match actual vacancies experienced and will work to more accurately project vacancies beginning with the 2011 budget processes.

Issue OT.3 Overtime budgets are based on an estimated inflationary factor rather than actual rates experienced and forecasts for the Water Treatment and Solid Waste Divisions, contrary to best practices.

Recommendations
The overtime budgeting process should be adjusted in consideration of analysis of current conditions and expenditure levels so the following year's budget more accurately reflects expected actual expenditures. An analytical approach in setting the overtime budget may consider factors such as historical trends, expectations for the upcoming year and internal management operational goals.

Ongoing Activities Relevant to this Issue
Concur with recommendation

WTD overtime budgets for the audit period were increased only for inflation at rates provided by the Budget Office. See response to Finding OT.2 above, referring to the offset of salary under-expenditures with overtime over-expenditures. WTD agrees that overtime should be budgeted to more accurately reflect actual experience, and will work to more accurately project overtime in future budget processes beginning with the 2011 budget cycle.

Under expenditures in salaries due to vacancies were significantly offset by the over-expenditures in the overtime budget. Some portion of the overtime expended during the audit period was incurred to cover vacant positions. The salary and overtime budget line item when compared to actual expenses net was:

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WTD was even more effective in managing its total operating budget. WTD under expended its total operating budget by 2.54% in 2005, by 1.99% in 2006 and 0.85% in 2007.

SWD has adopted this recommendation, the 2010 budget request for overtime is based on a calcuation of actual projected overtime hours.

Issue OT.4 Solid Waste Division employees incur significant amounts of unmonitored overtime hours, which may result in increased costs to ratepayers.

Recommendations
We recommend that SWD develop and implement formal documented overtime policies regarding the use and payment of unauthorized overtime. The policy should state the circumstances in which overtime may be incurred without preauthorization, and should also state that overtime worked that is not in accordance with the policy will not be paid. We also recommend that the Division negotiate the installation of cameras at the transfer stations into their bargaining agreements as a management right. This will increase safety for the employees and also allow for increased management oversight of employee labor hours. We believe the installation of cameras is not a change in working conditions and therefore should

not be a negotiable item. Finally, we recommend that the division update its GPS technology in order to better monitor truck drivers.

Clarification of Issue Section

The majority of overtime in the transfer and transportation sections is to provide coverage for employees who are on leave. For example, for the transfer station operators, approximately 86% of all overtime is to cover absences due to vacation, sick leave, etc. Unlike most office work, which can wait until an employee returns or be spread amongst other employees, the transfer station operation requires that a certain number of employees be present. Part-time employees provide a portion of the coverage, but cannot cover all of the needed hours.

Approximate Transfer Station Operator (TSO) overtime by reason:

TSO extended shift OT	6%
TSO meetings/training on OT	8%
TSO coverage OT	86%

SWD has analyzed costs and benefits of using overtime to provide coverage rather than hiring additional part-time workers. Due to the seasonal nature of the business, the cost of hiring and training, and the high benefit cost for each added employee, overtime provides a more efficient use of funds than hiring additional staff. However, we aim for an annual average of 10 to 15 percent as we understand that having employees work large amounts of overtime tends to create additional numerical and non-numerical costs, e.g., increase in L&I claims, increase burnout or illness, and a decrease in employee morale potentially leading to higher attrition rates.

Most overtime is pre-approved by the supervisor. For example, when the supervisor approves a leave request, any necessary coverage for that leave is automatically pre-approved. In some cases the overtime may not specifically be pre-approved, but approval is implied due to the circumstance of the overtime, such as extended shift overtime to stay late at a transfer station if customers are still on site at closing. In this case, even though the supervisor may not be on site to observe, he or she does have the ability to check the appropriateness of the overtime by reviewing scale house computer records. Overtime is also regularly monitored by reviewing timesheets as well as via bi-weekly reports. Supervisors follow up with employees on any improper use of overtime and employees may be subject to discipline for such actions.

Ongoing Activities Relevant to this Issue

Do not concur with recommendation

As stated in FL-1, SWD is pursuing installation of cameras at transfer stations through negotiations with the representing union as directed by the Washington State Public Employee Relations Commission, which has determined that installation of cameras does represent a change in working conditions and is a required subject of bargaining. The GPS system does provide information about the whereabouts of SWD vehicles, although truck drivers are not actively tracked.

Management has communicated overtime expectations to staff via memorandum and the employees have generally met these expectations. Exceptions are handled on a case-by-case basis. SWD will consider if a more formal policy is desirable. Any such policy would not include a stipulation that unauthorized overtime will not be paid; it would be illegal not to pay for work performed, even if it is unauthorized.

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Biogas use

Issue BG.1: Lack of adequate project planning has resulted in a tripling of estimated construction costs for the waste-to-energy project from $6.1 million to $17 million between 2004 and 2008.

Recommendations
The tripling costs above the initial estimate are atypical. To improve future estimates, the WTD should require engineering consultants to complete cost estimation analyses in accordance with "GAO Best Practices for Estimating and Managing Program Costs and complete internal evaluations in accordance with AACE International Recommended Practice No. 16R-90 Conducting Technical and Economic Evaluations –As Applied for the Process and Utility Industries." These practices include defined procedures for both sensitivity analyses and risk analyses. The WTD should also consider design-build contracts, which are an industry-leading best practice to eliminate the cost estimate disconnects between the designer and the builder.

Clarification of Issue Section
The waste-to-energy project was one project out of more than 60 design and construction projects managed by WTD. Budget development for this particular project was unusual because there were several technologically complex alternatives to be analyzed and evaluated from both performance and economic perspectives within a very constrained project site during a time when costs in the construction industry were highly volatile. When the cost estimates were higher than expected the project was put on hold until a formal evaluation could be conducted to validate project costs considering the sale of waste gas and the ability to secure grant funding.

Since this project's inception, WTD established estimating standards based on the Association of Advancement of Cost Engineering standards and implemented these throughout its capital program in 2004.

Ongoing Activities Relevant to this Issue
Concur with recommendation

WTD has used the design-build and other alternative delivery contracting methods where it has been evaluated and determined to be a cost effective delivery methodology. WTD will continue to consider the use of alternative contracting on future projects where there is appropriate application for the project.

Issue BG.2: The WTD prepurchased critical equipment totaling $4.8 million prior to developing an accurate budget for the construction of the waste-to-energy project, contrary to best practices.

Recommendations
WTD's internal procedures should include industry-standard project management practices, such as a critical path project schedule and receipt of certified drawings from manufacturers

in advance of purchase. For major new projects, the WTD should first consider the uncertainty of the total project estimate prior to authorization of major capital equipment purchases. Means of evaluating and reporting uncertainty are identified in the recommendations presented in Issue BG.1.

Ongoing Activities Relevant to this Issue
Concur with the recommendation

Over the last two years, WTD introduced and began to apply Project Management Institute (PMI) standard processes to the management of its capital projects. PMI promotes best practices in the project management industry in areas of scope, schedule and budget management, control and monitoring, and reporting.

In early 2009, WTD began implementing Critical Path Method (CPM) scheduling in its procedures for all contracts. Additionally, WTD has implemented project management procedures requiring individual project plans (plans) to be developed. The plans include procurement strategies for design services, pre-purchased equipment procurement, and construction contracting. Pre-purchase of equipment is a milestone in the newly adopted CPM schedule template and is used when pre-purchased equipment is identified as a procurement option. The pre-purchase milestone would occur in the design process between 60 and 90 percent design. Identification of equipment pre-purchase requires review and approval of the preferred methodology by the WTD Change Review Board before proceeding with a contracting process and procurement strategy. Pre-purchase of equipment will only be used where schedule accomplishment is in the project driver.

Issue BG.3: The Wastewater Treatment Division is implementing a new waste-to-energy power generation capital project that will cost $952,000 more per year than a "no action" alternative, contrary to County Ordinance.

Recommendations
The WTD should pursue projects that are cost effective, consistent with its County Ordinance requirement. Where appropriate, decision making should include representation of those who live outside the King County's jurisdiction and utilize entities such as the Metropolitan Water Pollution Abatement Advisory Committee (MWPAAC), which includes representatives of all rate-paying districts, to capture the consensus of all of the utility's customers.

Ongoing Activities Relevant to this Issue
Concur with recommendation

WTD agrees with the recommendation that WTD should pursue cost effective projects consistent with its County Ordinance requirements and that representation of all of our customers is essential.

The auditor appears to have incorrectly drawn the above conclusions from CDM'S December 2007 report (Assessment of Alternatives for Beneficial Use of Digester Gas at the West Point Treatment Plant), which recommended Alternative 1, which projected annual costs of $952K a year. CDM's 2007 estimate did not consider the value of potential revenues from sale of Renewable Energy Credits (RECs) that would be derived from the project, or grant funding from EPA.

WTD management's response to the CDM 2007 findings was that Alternative 1 would not be implemented unless the costs could be significantly reduced and be cost effective. Negotiations with Seattle City Light on compensation for sale of Renewable Energy Credits, and with EPA on appropriation of grant funding are now being finalized. As a result of revenues that will flow from these agreements, the project that will be implemented is expected to be cost-effective.

WTD agrees that representation of all of our customers in the decision-making process is essential. MWPAAC adopted a charter on May 28, 2008 which states that review and recommendations related to WTD's planning and capital programs is one of the goals and objectives for the committee. MWPAAC's Charter was adopted by motion of the King County Council on March 9, 2009. WTD will continue to seek MWPAAC input as appropriate.

Issue BG.4: The West Point Water Treatment Plant waste-to-energy project will not have the option of scrubbing and selling a portion of the biogas as a commodity which, as evidenced at the South Plant, can lower the costs of plant operations and reduce the rates charged to ratepayers.

Recommendations
It is recognized that site-specific conditions at the West Point Plant Site may limit the potential benefit of diverting all biogas to the local utility. However, given the observation that under the current plan that the South Plant will continue to be generating a revenue stream greater than $1.0 million per year and the West Point Plant will likely operate at a loss, as detailed in BG.3, additional review is warranted.

The WTD should ask the local utility provider to define in writing the performance criteria (e.g., gas composition, pressure) under which it would allow gas to be transferred and sold through the utility. Engineering options (including items such as modification of the existing pipeline, laying new pipe, on-site gas storage or compress and truck the gas) could then be explored based on these parameters.

Ongoing Activities Relevant to this Issue
Do not concur with recommendation

Constructing a combination of facilities to maximize versatility as suggested would have significantly increased capital costs, where it is recognized one of the WTD project objectives was to minimize capital costs while providing for beneficial use of the gas. The size of the pipe required, the location of the West Point plant at the terminus of the gas line, and the

impact of permit conditions including potential constraints on scrubbing tower height, indicated potential for gas scrubbing and sale at West Point was not comparable to South Plant. Continued investigation of this weak alternative was not deemed to be a prudent use of WTD resources. Investigating it to the level recommended would have required expanding the project scope, budget and schedule for the Alternatives Analysis.

Biosolids management

Issues and recommendations – biosolids management

Issue BI.1: The biosolids program lacks a long-term strategic plan that defines the specific goals related to the sales of biosolids which can reduce the rates charged to ratepayers.

Recommendations
The WTD should pursue a long-term strategy for defining criteria for screening, selecting and managing a pool of vendors under a competitive bid process. All of these actions should be conducted at planned intervals. Additional goals include expanding the market interest of the biosolids product to increase the price end-users are willing to pay. Goals established as part of the strategic plan should adhere to leading industry practices to ensure they are specific, measurable, attainable, relevant and time-bound.

Clarification of Issue Section
It should be noted that King County's Biosolids Program was one of the first in the nation to have independent audits of its program. National Biosolids Partnership included this strategy as part of a Code of Good Practices and used the WTD Biosolids Program as a model. The Code of Good Practices ultimately became the core of a new national Environmental Management System (EMS). Strategic planning is a core concept employed by WTD's Biosolids Program and a long term strategy for biosolids management was detailed in the 1999 Regional Wastewater Services Plan. The core strategies identified in the RWSP formed the basis for the WTD Biosolids Program as implemented today.

Ongoing Activities Relevant to this Issue
Concur with recommendation

In response to this issue and the recommendations, WTD solicited information from the market in July 2008 on alternative biosolids management options. The analysis of responses to the Request for Information was completed and a presentation made to Council June 2009. WTD is proceeding to development of a Biosolids Strategic Plan. This plan will include goals and objectives whose form adheres to best industry practices and will translate to specific performance measures in annual business plans. The estimated completion date for the plan is the second quarter of 2011.

Issue BI.2: Management has not established adequate coding and classification of time and revenues for application sites to allow their selection based on which is most cost effective.

Recommendations
The WTD should establish internal guidance on the coding and collecting of time, expenses and revenue within the biosolids program. The guidance should also include monthly review procedures to identify errors and opportunities for improvements. Revenue from the sales of biosolids, transportation costs and other managerial costs should be directly assigned to a cost center code that defines an application site, whenever possible. In cases where the work is related to the general management of the program, the costs should be collected in a

manner allowing these expenses to be prorated among the facilities, based on the percentage of biosolids delivered to them.

Clarification of Issue Section
The WTD Biosolids Program already has the capability to report on the costs of individual sites but distribution is not dependent on cost alone. Many factors, including site conditions and haul routes, determine the amount of biosolids sent to any particular market.

Adequate guidance on coding and collecting of time, expenses and revenue within the biosolids program already exists. The data exists in the present accounting system to allow the compilation of cost per ton for each biosolids distribution site, as demonstrated by the production of that data for the recent biosolids budget proviso report presented to the King County Council. While WTD's current accounting system is adequate to provide the necessary data to calculate cost per ton by application site, there is no easy way to automate this calculation. While making comparisons of cost per ton for each distribution site provides useful information, it is not necessarily an easy process, or one without significant costs of its own.

The annual budget for biosolids is built from assumptions based on the most feasible and effective distribution plan and aggregate costs are compared to budget projections on a monthly basis. Presently, when distribution plans change because of site or haul route conditions, choices in alternative sites do not greatly impact the total cost because the alternative sites are actually reasonably close in cost per ton. Most recent variances have been more influenced by changes in fuel prices rather than site selection.

In accordance with adopted King County policy, the biosolids program makes distribution decisions on a variety of critical factors, and not solely on the basis of cost per ton for each distribution site. Other critical factors in deciding where and when various sites can be used are availability, weather, and provisions in contracts with application contractors and landowners. Monthly distribution could be said to be more "demand" driven than cost derived. Besides cost, other factors used in initially selecting projects include reliability, flexibility, strong local sponsor, community/agency support, year-round access, storage capacity, additional diversity, demonstrable benefits, and social justice and equity.

Ongoing Activities Relevant to this Issue
Concur with recommendation

WTD agrees that it is useful to calculate cost per ton per distribution site periodically, in correlation with the budgeting process and in response to any major changes in the biosolids program. WTD management will ensure that this calculation is done at least once a year, or as beneficial to decision-making for the program.

Issue BI.3: Biosolids Program Team has not sought compensation from other municipalities or utility districts for the management of their biosolids material.

Recommendations
The BPT should identify those activities that serve a general benefit to all users of an application site and place these expenses and time under separate project codes. Where possible and cost beneficial, the team should seek agreements with other users of these facilities to share these expenses on an agreed and prorated basis, such as the volume of biosolids applied in the past year.

Clarification of Issue Section
The wording of the title for BI.3 is incorrect and misleading. WTD does not manage or have responsibility for biosolids from any other utility. Application contractor Boulder Park Inc. handles biosolids from several different utilities, including biosolids from King County.

Ongoing Activities Relevant to this Issue
Concur with recommendation

WTD annually summarizes and publishes its own biosolids application records and monitoring results for this site. As a courtesy to the other utilities and as a convenience for interested parties, WTD includes the application records of other utilities. In the future, WTD staff will identify significant expenses appropriate for cost-sharing, and evaluate practical and equitable means for prorating costs to other users of application sites.

Issue BI.4: Management can increase the amount they charge for biosolids material which can reduce the rates charged to ratepayers.

Recommendations
The WTD should try to improve its marketing of the material and expand the sales base, allowing for an increased sales price. This, in turn, would lower the cost of the biosolids program to the benefit of the ratepayers.

Ongoing Activities Relevant to this Issue
Concur with recommendation

WTD is preparing to enter negotiations for its biosolids land application contracts and will have opportunities to reexamine the appropriate market value for its product. It is questionable whether spending more time on marketing would provide any appreciable benefit to the biosolids program considering supply and demand issues.

WTD already recycles 100 percent of its biosolids and the demand for the product exceeds the supply. There are over 100 potential customers signed up for biosolids, while the plants can only produce enough to supply a few customers per year. For this reason, increased marketing could be counter-productive since supply could not meet the demand.

WTD will continue to review opportunities to promote the benefits of using biosolids in order to keep its markets strong. It will seek to maintain and increase fertilizer revenue appropriate to the market economics.

Information technology

Issues and Recommendations – Information Technology

Audit Issue IT.1: Information Technology system change controls do not meet industry standards

Recommendations
SWD and WTD should develop policies and procedures around the change management process to incorporate industry best practices. Specifically, the creation and enforcement of segregation of duties (SOD) matrixes and review policies to enforce responsibilities within the change management process that should be separated logically and organizationally to prevent individuals from performing conflicting duties. Also, documentation related to the change management should be retained for a specified period.

Clarification of Issues Section
The background discussion does not recognize the County's segregation of duties and management's approval for implementations, and that audit records are maintained. The statement that there are "no controls around monitoring the production environment" is highly generalized and not correct.

Peoplesoft
In the Peoplesoft system, a change management policy exists that the individual responsible for moving changes to the production environment does not have development responsibilities. A full audit trail exists in Peoplesoft which details the user id which placed the change in the system.

Oracle
Configuration changes are captured by user id and date, and stored in the base tables for audit purposes. To mitigate risk we have enhanced the change log inventory to include all authorized changes. Changes only occur based upon client requests that are approved by management and authorized for implementation.

The issues discussion is not specific to any application or environment with respect to monitoring of change management. Risks associated with unauthorized changes are mitigated by business process. Standard business operating procedures include validation and balancing controls to ensure correct and accurate processing as expected on a daily basis.

Changes are approved by a client authorized representative and the technical manager. Physical move of objects to production is performed by Data Control for the mainframe and DBA's for the Oracle Financial environment.

For all changes, we perform post implementation reviews to confirm that the fully tested and authorized changes perform as anticipated in the production environment.

We do not electronically monitor the environment for all potential changes and validate against all authorized changes in the same time period. Such a practice would be cost prohibitive based on the volume of the code base and the number of objects in the production environment.

The two DBAs in the technical support team have the access permissions required to enable them to apply vendor supplied patches, vendor supplied updates and to add enhancements as enabled by the product for King County defined forms and interfaces when needed or mandated. The permissions granted to the DBAs are essential for them to perform their job responsibilities.

King County's implementation of the Oracle Financials system (IBIS) is primarily a maintenance environment with minimal enhancements.

Ongoing Activities Relevant to this Issue
Concur with recommendation

Peoplesoft
An audit report is currently under development for Peoplesoft, that will detail changes made to the production environment by anyone other than those ids authorized to make production changes. This report will be completed and implemented in September 2009.

Oracle
An audit report containing developer and DBA changes recorded in the production data base of transactional activity for Oracle has been developed and is run and reviewed by the technical manager on a weekly basis.

For Oracle the change log inventory has been enhanced to include all authorized changes. Changes only occur based upon client requests that are approved by management and authorized for implementation.

Change Management Project
King County KCIT-Central has begun a project to standardize IT change management for all production systems in all county agencies. The project team will consist of a representative from each county department/agency. This representative will contribute information about their department/agency's change management process and work with team members to design the countywide system. The overall goal of this effort is to leverage existing change management processes and data to create a single, centralized change management system that will respond quickly and responsibly to changes in production infrastructure and business applications.

WTD
Working with IBIS Business Support team and Finance and Business Operations Division (FBOD) staff , user responsibilities will be developed allowing access to the appropriate functions. This effort will include identifying system access requirements needed and appropriate for all positions. The available standard user responsibilities will be reviewed to

determine whether they provide access to the needed functions. Segregation of functional responsibilities and access privileges will be included in this effort.

Issue IT.2: Information Technology access controls do not meet industry standards.

Recommendations
SWD and WTD should review the policies and procedures around the logical access process to incorporate industry best practices specifically related to termination of users, review of user rights and documentation retention. In addition, we recommend that management review all users and responsibilities and identify conflicting roles and excessive access. In addition, management should create a Segregation of Duties Matrix by which access change request would be evaluated for potential conflict of duties.

Clarification of Issues Section
Oracle
King County Oracle super users are located in their respective functional business units and have the ability to make super user changes as defined for their role/responsibility.

Three levels of approval are required when assigning permissions to a user to ensure correct access is provided and that conflicts do not exists. Those three areas are:

1. Manager of the requestor
2. Business owner manager of the functional area
3. Technical manager

Super user configuration permissions are established as standard permission settings provided by Oracle.

Risk is mitigated by the use of an authorization form to add or modify permissions. The form is submitted and reviewed by both the individual's manager as well as a technical manager. In addition, the responsibility access request form must be reviewed and approved by the business owner manager of the functional area. The approval process is intended to validate the permission request change.

Super user changes are recorded in the base tables of the IBIS system by user id and date, thus a history of changes are recorded.

The developer identified as having system admin permission is correct, however the developer also performs system administration activities as defined in her job role/responsibilities and under the supervision of the master DBA who assigns and reviews her activity. The audit report does not reflect this compensating control.

Peoplesoft
PeopleSoft systems maintains a stringent protocol covering who is given "power user" (as defined by any user having anything other than self-service access to the system) access to the system. This protocol involves a request process which is authorized by the requestor's manager, a local security approver (within the department) and the PeopleSoft security officer. As such, it is unlikely that access would be granted inappropriately.

As previously documented, PeopleSoft systems use a nightly process to disable PeopleSoft access from terminated employees. A termination report also exists that could be run on a weekly basis and distributed to the managers of non-PeopleSoft systems to assist them in this function.

Mainframe and MSA
The audit finding of 1 in 6 users was against a select sampling of employees who had mainframe portal page access (TPX). The sampling was not a direct correlation to those having MSA payroll access. Those having mainframe portal page permissions (TPX) do not have by default MSA payroll access; such access to MSA is limited.

Network access is removed for employees who have left the county. Employees without network access are unable to establish a TPX session on the mainframe.

The audit revealed that 2 terminated employees had access to MSA, however those 2 employees had been re-hired and thus their access was appropriate.

Ongoing Activities Relevant to this Issue
Concur with recommendation

Peoplesoft
A PeopleSoft report has been developed to provide detail department, job code, and time and labor group changes that occur for those users who have more than self-service access. This report will be run automatically and distributed to the PeopleSoft security officer for analysis. This will alert the security officer to employees changing *job capacities* and prevent the improper retention of rights as an employee moves from one job to another.

Oracle
For Oracle, a quarterly review / report of all super user permissions has been developed and is distributed to each business functional area for validation of correct permissions.

MSA
For MSA, at the time of the audit, King County practice was to review user access at least twice a year. Since the audit, this process has been increased to be performed quarterly.

SWD
The division is in the process of updating its procedures for documenting access to information systems and physical locations, including county property issued to employees. The new procedures will document the access and removal (from access) to information systems as well as the issue and return of tangible items. Creation of the Segregation of Duties Matrix is part of this project.

A simplified draft outline of the updated procedure follows:

- A standard document will be maintained for each employee, listing information system, building, and other access granted. This document will include county property used for access (e.g., keys, key cards, codes.)
- The document will be completed and initialed by the supervisor authorizing access and/or the issuance of county property, and placed in the employee's personnel file by the Solid Waste Division Human Resources Unit.
- Any changes to employee access or property will be documented by supervisors and forwarded to the SWD Human Resources Unit (HR.)
- Upon termination, SWD HR will provide the document listing access and property to the supervisor. The supervisor will be responsible for coordinating with other Division work units to ensure that all access is removed, and county property is recovered from the employee.
- Completion of access removal / property recovery will be documented on the form, which will be returned to the Human Resources Unit. SWD HR is responsible for including this documentation in the employee's personnel file.

While the above procedures will cover new employees, a parallel effort must be made to document access and property of existing employees. Supervisors will be asked to fill out the access document for each employee. This will lead to the creation of the Segregation of Duties Matrix for management review. SWD estimates that this project will be completed in the third quarter of 2009.

WTD

WTD has established an internal work team to develop WTD specific policies and procedures addressing the documentation and notification needs, as recommended by this report, for change in employee status and changes in access privileges. Development of the policies will be a joint effort between WTD's HR Section, Finance and Administration Section and IT Section. King County IT and WTD Finance are also reviewing current users and responsibilities to ensure adequate review and monitoring of access privileges and access change requests to avoid potential conflicts and appropriate segregation of duties.

Issue IT.3: Access to data centers and environment controls in the data centers do not meet industry standards.

Recommendations
The creation of a Global Standard Operating Procedure (SOP) should be established at a high level to define the minimum standards for all data processing facilities. Individual data center SOP's may also be of use in defining individual facility rules and expectations.
The Global policy should define individuals' roles and responsibilities within a data center, define data center environment standards and update facilities according to guidance such as COBIT 4.1 and the ISO 27002 framework. It should also be mandated that access be to the facility is provisioned, de-provisioned and reviewed on a regular basis.

Ongoing Activities Relevant to this Issue
Concur with recommendation

King Street Center
SWD IT and building maintenance staff have access to the division's data center; access is via keypad entry. The division has addressed problems with the environmental controls in the data center with building management.

Seattle Municipal Tower (SMT)
The SMT data center is being addressed in the following ways:

- All access for entry to the SMT data center has been removed except for: operators, operations supervisors, the data center manager, and facilities engineer.
- Other access will be closely controlled by Computer Operations staff on an as needed basis.

The long term resolution is progressing at this time with the construction of a new Data Center and scheduled occupancy later in 2009. Controls to be put in place at the new data center will exceed minimal requirements and are based on current guidelines of both Industry and the Federal government. Access controls to be put in place are based on ISO 17799 / ISO 20005 / NIST800-53 and environmental controls are based on TIA-942. There is also a new Standard Operating Procedure (SOP) that is currently being created for the new data center. At this time, the server move partially completed, and on schedule.

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